User Guide

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Product notice

This user guide describes features that are common to most models. Some features may not be available on your computer.

To obtain the latest information in this guide, contact support. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

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For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

Safety warning notice

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

Table of contents

1 Welcome 1

Fun things to do 1

Finding information 2

2 Getting to know your computer 4

Top 4

TouchPad 4

Lights 6

Buttons and fingerprint reader (select models only) 7

Keys 9

Front 10

Right 11

Left 13

Rear 14

Display 15

Bottom 16

3 Connecting to a network 18

Connecting to a wireless network 18

Using the wireless controls 18

Using the wireless button 18

Using operating system controls 19

Using a WLAN 19

Using an Internet service provider 19

Setting up a WLAN 20

Configuring a wireless router 20

Protecting your WLAN 20

Connecting to a WLAN 21

Using HP Mobile Broadband (select models only) 21

Inserting and removing a SIM 22

Using Bluetooth wireless devices 23

Connecting to a wired network 24
Connecting to a local area network (LAN) 24
Using a modem 24
Connecting a modem cable 24
Connecting a country- or region-specific modem cable adapter 25

4 Pointing devices and keyboard 26
Using pointing devices 26
Setting pointing device preferences 26
Using the pointing stick 26
Using the TouchPad 26
Turning the TouchPad off and on 26
Using TouchPad Gestures 27
Tapping 27
Scrolling 28
Pinching/zooming 28
Rotating (select models only) 29
Using the keyboard 29
Identifying the hot keys 30
Using keypads 31
Using the embedded numeric keypad 31
Turning the embedded numeric keypad on and off 32
Switching key functions on the embedded numeric keypad 32
Using an optional external numeric keypad 32

5 Multimedia 33
Using the media activity controls 33
Audio 33
Connecting speakers 33
Connecting headphones 33
Connecting a microphone 34
Adjusting the volume 34
Checking audio functions on the computer 34
Webcam (select models only) 35
Video 35
VGA 35
DisplayPort (select models only) 36

6 Power management 37
Shutting down the computer 37

Setting power options 38
Using power-saving states 38
Initiating and exiting Sleep 38
Enabling and exiting user-initiated hibernation 38
Setting password protection on wakeup 39
Using the power meter 39
Using the power meter and power settings 39
Using battery power 39
Finding additional battery information 40
Using Battery Check 40
Displaying the remaining battery charge 40
Maximizing battery discharge time 40
Managing low battery levels 41
Identifying low battery levels 41
Resolving a low battery level 41
Inserting or removing the battery 41
Inserting a battery 41
Removing a battery 42
Conserving battery power 42
Storing a user-replaceable battery (select models only) 42
Disposing of a user-replaceable battery (select models only) 43
Replacing a user-replaceable battery (select models only) 43
Using external AC power 43
Testing an AC adapter 44
Switchable graphics/dual graphics (select models only) 44
Using switchable graphics (select models only) 45

7 External cards and devices 46

Using Media Card Reader cards (select models only) 46
Inserting a digital card 46
Removing a digital card 47
Using ExpressCards (select models only) 47
Configuring an ExpressCard 47
Inserting an ExpressCard 48
Removing an ExpressCard 49
Using smart cards (select models only) 49
Inserting a smart card 50
Removing a smart card 50
Using a USB device 50
Connecting a USB device 51
Removing a USB device 51

Using an eSATA device (select models only) ... 51
Connecting an eSATA device ... 52
Removing an eSATA device ... 52
Using optional external devices ... 52
Using optional external drives ... 53
Using the docking connector ... 53

8 Drives ... 54
Handling drives ... 54
Using hard drives ... 55
Removing or replacing the service cover ... 55
Removing the service cover ... 55
Replacing or upgrading the hard drive ... 56
Removing the hard drive ... 56
Improving hard drive performance ... 57
Using Disk Defragmenter ... 57
Using Disk Cleanup ... 57
Using HP 3D DriveGuard (select models only) ... 57
Identifying HP 3D DriveGuard status ... 58
Managing power with a parked hard drive ... 58
Using HP 3D DriveGuard software ... 58
Using optical drives (select models only) ... 59
Identifying the installed optical drive ... 59
Inserting an optical disc ... 59
Tray-load ... 59
Removing an optical disc ... 60
Tray-load ... 60
When the disc tray opens normally ... 60
When the disc tray fails to open normally ... 61
Sharing optical drives ... 63

9 Security ... 64
Protecting the computer ... 64
Using passwords ... 65
Setting passwords in Windows ... 65
Setting passwords in Computer Setup ... 65
Managing a BIOS administrator password ... 66
Entering a BIOS administrator password ... 67
Managing a Computer Setup DriveLock password ... 68
Setting a DriveLock password ... 68
Entering a DriveLock password ... 69

Changing a DriveLock password 69
Removing DriveLock protection 70
Using Computer Setup Automatic DriveLock 70
Entering an Automatic DriveLock password 70
Removing Automatic DriveLock protection 71
Using antivirus software 71
Using firewall software 71
Installing critical security updates 72
Installing an optional security cable 72
Using the fingerprint reader (select models only) 73
Locating the fingerprint reader 73

10 Maintenance 74
Adding or replacing memory modules 74
Cleaning your computer 76
Cleaning products 76
Cleaning procedures 77
Cleaning the display 77
Cleaning the sides and cover 77
Cleaning the TouchPad and keyboard 77
Updating programs and drivers 78
Using SoftPaq Download Manager 78

11 Backup and recovery 79
Backing up your information 79
Performing a system recovery 80
Using the Windows recovery tools 80
Using f11 recovery tools 81
Using Windows 8 operating system media (purchased separately) 81
Using HP Software Setup 82

12 Computer Setup (BIOS) and Advanced System Diagnostics 83
Using Computer Setup 83
Starting Computer Setup 83
Navigating and selecting in Computer Setup 83
Restoring factory settings in Computer Setup 84
Updating the BIOS 85
Determining the BIOS version 85
Downloading a BIOS update 86
Using Advanced System Diagnostics 87

13 Support 88
Contacting support 88
Labels 89

14 Specifications 90
Input power 90
Operating environment 91

Appendix A Traveling with the computer 92

Appendix B Troubleshooting 94
Troubleshooting resources 94
Resolving issues 94
The computer is unable to start up 94
The computer screen is blank 95
Software is functioning abnormally 95
The computer is on but not responding 95
The computer is unusually warm 95
An external device is not working 96
The wireless network connection is not working 96
The optical disc tray does not open for removal of a CD or DVD 97
The computer does not detect the optical drive 98
A disc does not play 98
A movie is not visible on an external display 98
The process of burning a disc does not begin, or it stops before completion 99

Appendix C Electrostatic discharge 100

Index 101

1 Welcome

After you set up and register the computer, it is important to take the following steps:

- Take a minute to browse the printed Windows 8 Basics guide to explore the new Windows® features.

TIP: To quickly return to the computer Start screen from an open app or the Windows desktop, press the Windows logo key on your keyboard. Pressing the Windows logo key again will return you to the previous screen.

- **Connect to the Internet**—Set up your wired or wireless network so that you can connect to the Internet. For more information, see Connecting to a network on page 18.
- **Update your antivirus software**—Protect your computer from damage caused by viruses. The software is preinstalled on the computer. For more information, see Using antivirus software on page 71.
- **Get to know your computer**—Learn about your computer features. Refer to Getting to know your computer on page 4 and Pointing devices and keyboard on page 26 for additional information.
- **Find installed software**—Access a list of the software preinstalled on the computer:

  From the Start screen, type `a`, click **Apps**, and then select from the displayed options. For details about using the software included with the computer, see the software manufacturer's instructions, which may be provided with the software or on the manufacturer's website.
- Back up your hard drive by creating recovery discs or a recovery flash drive. See Backup and recovery on page 79

Fun things to do

- Use the wireless trackpad and the new Windows 8 touch gestures for smooth control of images and pages of text. See Using TouchPad Gestures on page 27.

Finding information

The computer comes with several resources to help you perform various tasks.

Resources	For information about
Setup Instructions poster	• How to set up the computer • Help to identify computer components
Windows 8 Basics guide	Overview of using and navigating with Windows® 8.
Help and Support To access Help and Support, type `h`, and then select **Help and Support**. To obtain the latest information in this guide, contact support. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.	• Operating system information • Software, driver, and BIOS updates • Troubleshooting tools • How to access support
Regulatory, Safety, and Environmental Notices To access this guide, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select the **User guides**.	• Regulatory and safety information • Battery disposal information
Safety & Comfort Guide To access this guide, from the Start screen, type `HP`, select **HP Support Assistant**, select **My computer**, and then select the **User guides**. – or – Go to http://www.hp.com/ergo.	• Proper workstation setup, posture, health, and work habits • Electrical and mechanical safety information
Worldwide Telephone Numbers booklet This booklet is provided with your computer.	HP support telephone numbers
HP website To obtain the latest information in this guide, contact support. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.	• Support information • Ordering parts and finding additional help • Accessories available for the device

Resources	For information about
*Limited Warranty**	Warranty information
To access the warranty: From the Start screen, type `HP`, select **HP Support Assistant**, select **My computer** and then select **Warranty and services**. – or – Go to http://www.hp.com/go/orderdocuments.	

*You can find the expressly provided HP Limited Warranty applicable to your product located with the user guides on your computer and/or on the CD/DVD provided in the box. In some countries/regions, HP may provide a printed HP Limited Warranty in the box. For some countries/regions where the warranty is not provided in printed format, you may request a printed copy from http://www.hp.com/go/orderdocuments or write to:

- **North America**: Hewlett-Packard, MS POD, 11311 Chinden Blvd., Boise, ID 83714, USA
- **Europe, Middle East, Africa**: Hewlett-Packard, POD, Via G. Di Vittorio, 9, 20063, Cernusco s/Naviglio (MI), Italy
- **Asia Pacific**: Hewlett-Packard, POD, P.O. Box 200, Alexandra Post Office, Singapore 911507

When you request a printed copy of your warranty, please include your product number, warranty period (found on your service label), name, and postal address.

IMPORTANT: Do NOT return your HP product to the addresses above. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

2 Getting to know your computer

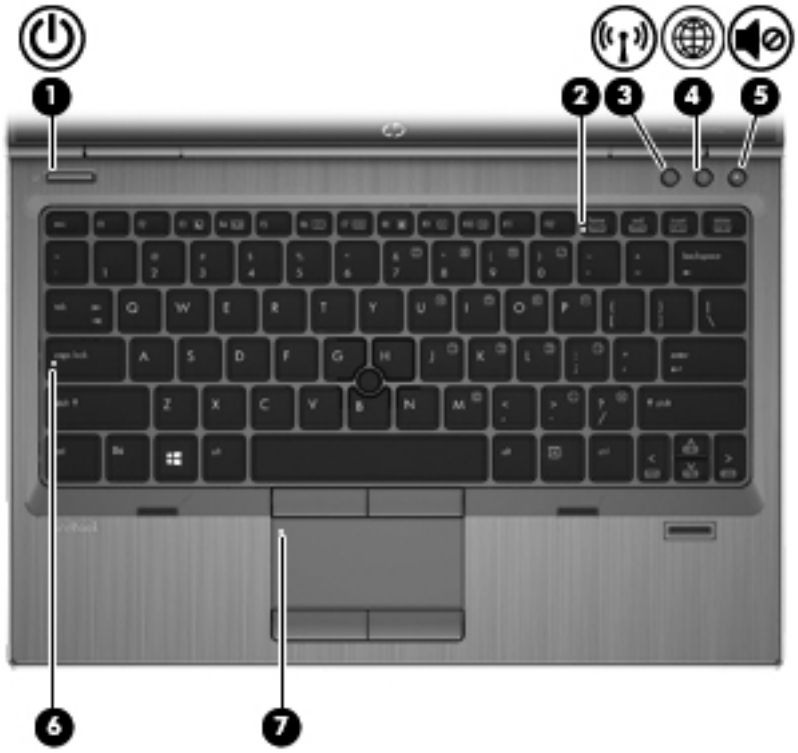
Top

TouchPad

Component		Description
(1)	Pointing stick	Moves the pointer and selects or activates items on the screen.
(2)	Left pointing stick button	Functions like the left button on an external mouse.
(3)	TouchPad on/off button	Turns the TouchPad on and off.
(4)	TouchPad zone	Moves the pointer and selects or activates items on the screen.
(5)	Left TouchPad button	Functions like the left button on an external mouse.

Component		Description
(6)	Right pointing stick button	Functions like the right button on an external mouse.
(7)	Right TouchPad button	Functions like the right button on an external mouse.

Lights



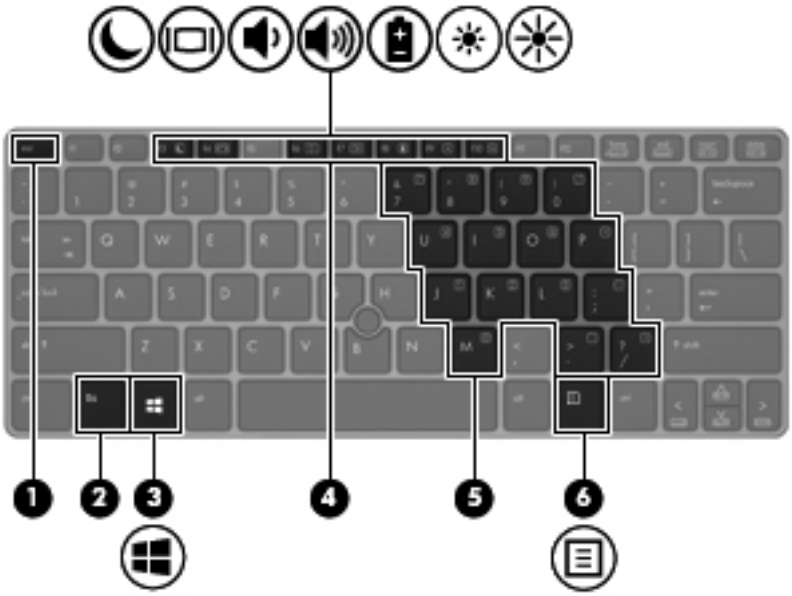
Component		Description
(1)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state. • Off: The computer is off.
(2)	Num lock light	White: Num lock is on.
(3)	Wireless light	• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. • Amber: All wireless devices are off.
(4)	Web browser light	• On: The computer is on. • Off: The computer is off.
(5)	Mute light	• Amber: Computer sound is off. • Off: Computer sound is on.
(6)	Caps lock light	On: Caps lock is on.
(7)	TouchPad on/off light	• Amber: The TouchPad is off. • Off: The TouchPad is on.

Buttons and fingerprint reader (select models only)

Component			Description
(1)		Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button will result in the loss of unsaved information. If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer. To learn more about your power settings, see your power options. From the Start screen, type `power`, select **Settings**, and then select **Power Options**.
(2)		Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.
(3)		Web browser button	Opens the default Web browser.

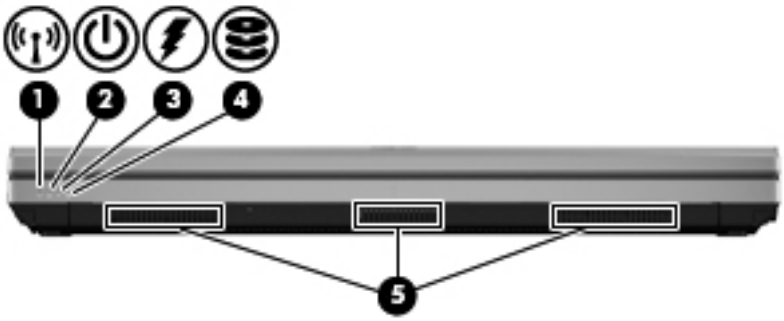
Component		Description
(4)	Volume mute button	Mutes and restores speaker sound.
(5)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



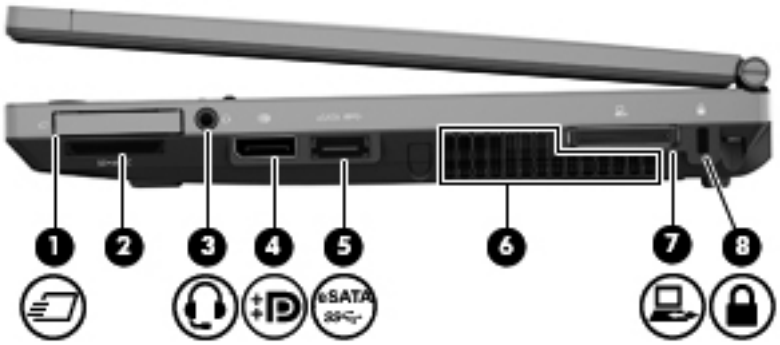
Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key or the esc key.
(3)	Windows logo key	Returns you to the Start screen from an open app or the desktop. **NOTE:** Pressing the Windows logo key again will return you to the previous screen.
(4)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(5)	Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(6)	Windows applications key	Displays the **Apps** toolbar.

Front



Component			Description
(1)		**Wireless light**	• **White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.** • **Amber: All wireless devices are off.**
(2)		Power light	• On: The computer is on. • Blinking: The computer is in the Suspend state. • Off: The computer is off or in Hibernation.
(3)		AC adapter/Battery light	• White: The computer is connected to external power and the battery is charged from 90 to 99 percent. • Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent. • Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. • Off: The battery is fully charged.
(4)		Hard drive light	• Blinking white: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(5)		Vents (3)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

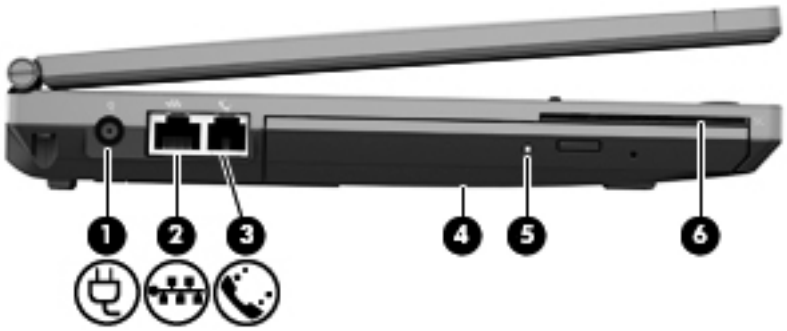
Right



Component			Description
(1)		ExpressCard slot	Supports optional ExpressCards or smart cards.
(2)		Media Card Reader	Supports the following digital card formats: • MultiMediaCard • Secure Digital (SD) Memory Card
(3)		Audio-out (headphone) jack/Audio-in (microphone) jack	Connect optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*. To access this guide, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select the **User guides**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(4)		DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(5)	eSATA	eSATA/USB 2.0 combo port	Connects a high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device.
(6)		Vents (2)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Component		Description
(7)	Docking connector	Connects an optional docking device.
(8)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left

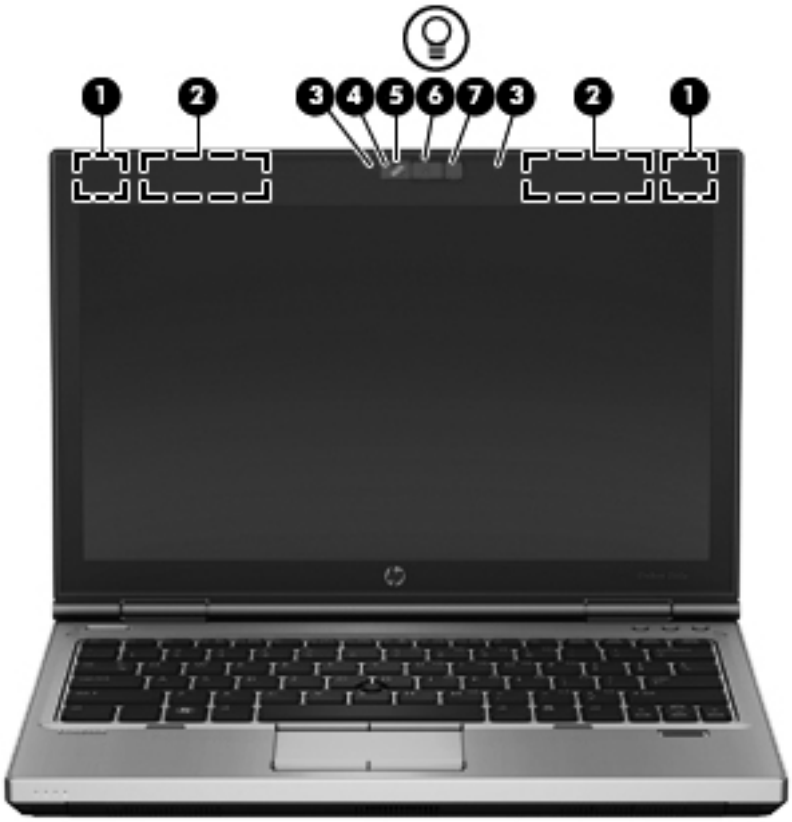


Component		Description
(1)	Power connector	Connects an AC adapter
(2)	RJ-45 (network) jack	Connects a network cable.
(3)	RJ-11 (modem) jack (select models only)	Connects a modem cable.
(4)	Optical drive	Reads and writes (select models only) to an optical disc.
(5)	Optical drive light	• On: The optical drive is being accessed. • Off: The optical drive is idle.
(6)	Smart card reader	Supports optional smart cards.

Rear

Component			Description
(1)		External monitor port	Connects an external VGA monitor or projector.
(2)		USB 2.0 port	Connects an optional USB device.
(3)		USB 3.0 port	Connects an optional USB device.

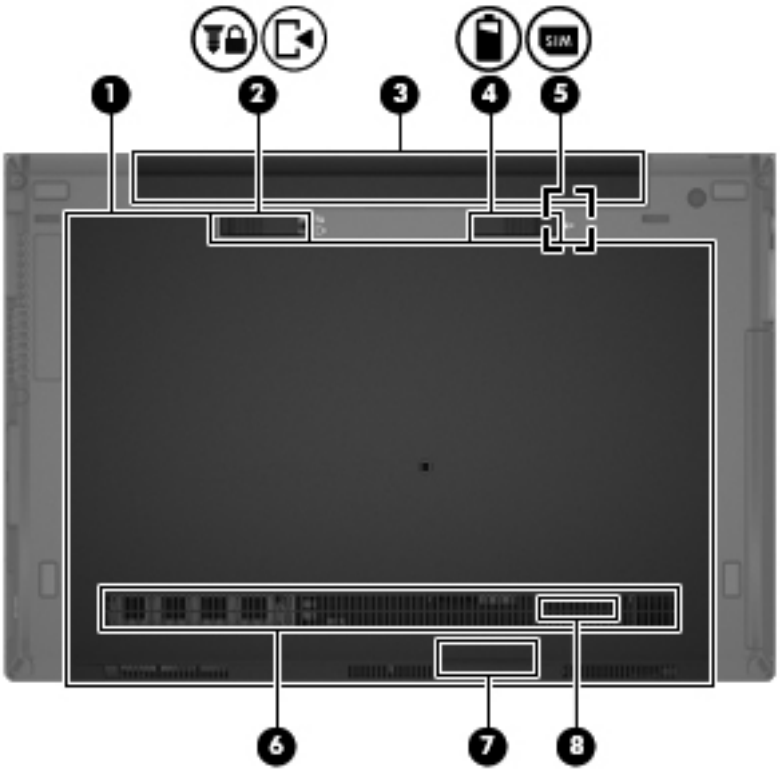
Display



Component		Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	WWAN antennas (2)*	Send and receive wireless signals to communicate with wireless wide area networks (WWAN).
(3)	Internal microphones (2)	Record sound.
(4)	Webcam light (select models only)	The webcam is in use.
(5)	Webcam (select models only)	Records video and captures still photographs. For information on using the webcam, access Help and Support. From the Start screen, type `h`, and then select **Help and Support**.
(6)	Keyboard light	Illuminates the keyboard, especially in low-light conditions.
(7)	Keyboard light button and ambient light sensor	Turns the keyboard light on or off.

*The antennas are not visible on the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access this guide, from the Start screen, type `HP`, select **HP Support Assistant**, select **My computer** and then select the **User guides**.

Bottom



Component			Description
(1)		Service cover	Contains the hard drive, the wireless LAN module slot, the WWAN module slot, and the memory module slots. **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.
(2)		Service cover release latch	Releases the cover for the hard drive bay and memory module slots. **NOTE:** A service cover screw is under the release latch.
(3)		Battery bay	Holds the battery.
(4)		Battery release latch	Releases the battery from the battery bay.
(5)	SIM	SIM slot	Supports a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.

Component		Description
(6)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(7)	Bluetooth compartment	Holds the Bluetooth device.
(8)	Speaker	Produces sound.

3 Connecting to a network

Your computer can travel with you wherever you go. But even at home, you can explore the globe and access information from millions of websites using your computer and a wired or wireless network connection. This chapter will help you get connected to that world.

Connecting to a wireless network

Wireless technology transfers data across radio waves instead of wires. Your computer may be equipped with one or more of the following wireless devices:

- Wireless local area network (WLAN) device—Connects the computer to wireless local area networks (commonly referred to as Wi-Fi networks, wireless LANs, or WLANs) in corporate offices, your home, and public places such as airports, restaurants, coffee shops, hotels, and universities. In a WLAN, the mobile wireless device in your computer communicates with a wireless router or a wireless access point.
- HP Mobile Broadband Module (select models only)—A wireless wide area network (WWAN) device that gives you wireless connectivity over a much larger area. Mobile network operators install base stations (similar to cell phone towers) throughout large geographic areas, effectively providing coverage across entire states, regions, or even countries.
- Bluetooth device—Creates a personal area network (PAN) to connect to other Bluetooth-enabled devices such as computers, phones, printers, headsets, speakers, and cameras. In a PAN, each device communicates directly with other devices, and devices must be relatively close together—typically within 10 meters (approximately 33 feet) of each other.

For more information about wireless technology, see the information and website links provided in Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

Using the wireless controls

You can control the wireless devices in your computer using these features:

- Wireless button, wireless switch, or wireless key (referred to in this chapter as the wireless button)
- Operating system controls

Using the wireless button

The computer has a wireless button, one or more wireless devices, and one or two wireless lights, depending on the model. All of the wireless devices on your computer are enabled at the factory, so the wireless light is on (white) when you turn on the computer.

The wireless light indicates the overall power state of your wireless devices, not the status of individual devices. If the wireless light is white, at least one wireless device is on. If the wireless light is off, all wireless devices are off.

NOTE: On some models, the wireless light is amber when all wireless devices are off.

Because the wireless devices are enabled at the factory, you can use the wireless button to turn on or turn off the wireless devices simultaneously.

Using operating system controls

The Network and Sharing Center allows you to set up a connection or network, connect to a network, manage wireless networks, and diagnose and repair network problems.

To use operating system controls:

1. From the Start screen, type `n`, and then select **Settings**.
2. Type `network and sharing` in the search box, and then select **Network and Sharing Center**.

For more information, from the Start screen, type `h`, and then select **Help and Support**.

Using a WLAN

With a WLAN device, you can access a wireless local area network (WLAN), which is composed of other computers and accessories that are linked by a wireless router or a wireless access point.

NOTE: The terms *wireless router* and *wireless access point* are often used interchangeably.

- A large-scale WLAN, such as a corporate or public WLAN, typically uses wireless access points that can accommodate a large number of computers and accessories and can separate critical network functions.
- A home or small office WLAN typically uses a wireless router, which allows several wireless and wired computers to share an Internet connection, a printer, and files without requiring additional pieces of hardware or software.

To use the WLAN device in your computer, you must connect to a WLAN infrastructure (provided through a service provider or a public or corporate network).

Using an Internet service provider

When you are setting up Internet access in your home, you must establish an account with an Internet service provider (ISP). To purchase Internet service and a modem, contact a local ISP. The ISP will help set up the modem, install a network cable to connect your wireless computer to the modem, and test the Internet service.

NOTE: Your ISP will give you a user ID and a password to use for Internet access. Record this information and store it in a safe place.

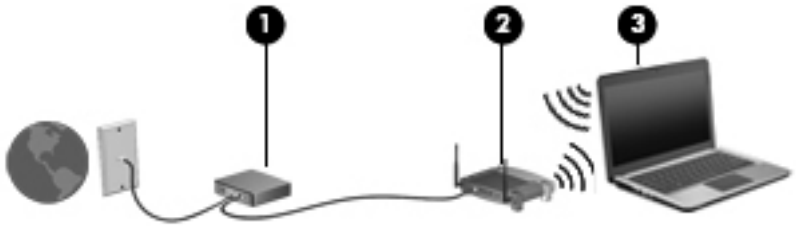
Setting up a WLAN

To set up a WLAN and connect to the Internet, you need the following equipment:

- A broadband modem (either DSL or cable) **(1)** and high-speed Internet service purchased from an Internet service provider
- A wireless router **(2)** (purchased separately)
- A wireless computer **(3)**

NOTE: Some modems have a built-in wireless router. Check with your ISP to determine what type of modem you have.

The illustration below shows an example of a wireless network installation that is connected to the Internet.



As your network grows, additional wireless and wired computers can be connected to the network to access the Internet.

For help in setting up your WLAN, see the information provided by your router manufacturer or your ISP.

Configuring a wireless router

For help in setting up a WLAN, see the information provided by your router manufacturer or your ISP.

NOTE: It is recommended that you initially connect your new wireless computer to the router by using the network cable provided with the router. When the computer successfully connects to the Internet, disconnect the cable, and access the Internet through your wireless network.

Protecting your WLAN

When you set up a WLAN or access an existing WLAN, always enable security features to protect your network from unauthorized access. WLANs in public areas (hotspots) like coffee shops and airports may not provide any security. If you are concerned about the security of your computer in a hotspot, limit your network activities to email that is not confidential and basic Internet surfing.

Wireless radio signals travel outside the network, so other WLAN devices can pick up unprotected signals. Take the following precautions to protect your WLAN:

- Use a firewall.

  A firewall checks both data and requests for data that are sent to your network, and discards any suspicious items. Firewalls are available in both software and hardware. Some networks use a combination of both types.

- Use wireless encryption.

Wireless encryption uses security settings to encrypt and decrypt data that is transmitted over the network. For more information, from the Start screen, type `h`, and then select **Help and Support**.

Connecting to a WLAN

To connect to the WLAN, follow these steps:

1. Be sure that the WLAN device is on. If the device is on, the wireless light is on. If the wireless light is off, press the wireless button.

   NOTE: On some models, the wireless light is amber when all wireless devices are off.

2. On the desktop, tap and hold, or click the network status icon in the notification area, at the far right of the taskbar.

3. Select your WLAN from the list.

4. Click **Connect**.

   If the WLAN is a security-enabled WLAN, you are prompted to enter a security code. Type the code, and then click **OK** to complete the connection.

   NOTE: If no WLANs are listed, you may be out of range of a wireless router or access point.

   NOTE: If you do not see the WLAN you want to connect to, from the desktop, right-click the network status icon, and then select **Open Network and Sharing Center**. Click **Set up a new connection or network**. A list of options is displayed, allowing you to manually search for and connect to a network or to create a new network connection.

After the connection is made, place the mouse pointer over the network status icon in the notification area, at the far right of the taskbar, to verify the name and status of the connection.

NOTE: The functional range (how far your wireless signals travel) depends on WLAN implementation, router manufacturer, and interference from other electronic devices or structural barriers such as walls and floors.

Using HP Mobile Broadband (select models only)

HP Mobile Broadband enables your computer to use WWANs to access the Internet from more places and over larger areas than it can by using WLANs. Using HP Mobile Broadband requires a network service provider (called a *mobile network operator*), which in most cases is a cellular phone network operator. Coverage for HP Mobile Broadband is similar to cellular phone voice coverage.

When used with mobile network operator service, HP Mobile Broadband gives you the freedom to stay connected to the Internet, send email, or connect to your corporate network whether you are on the road or outside the range of Wi-Fi hotspots.

HP supports the following technologies:

- HSPA (High Speed Packet Access), which provides access to networks based on the Global System for Mobile Communications (GSM) telecommunications standard.
- EV-DO (Evolution Data Optimized), which provides access to networks based on the code division multiple access (CDMA) telecommunications standard.

You may need the HP Mobile Broadband Module serial number to activate mobile broadband service. The serial number is printed on a label inside the battery bay of your computer.

Some mobile network operators require the use of a SIM. A SIM contains basic information about you, such as a personal identification number (PIN), as well as network information. Some computers include a SIM that is preinstalled in the battery bay. If the SIM is not preinstalled, it may be provided in the HP Mobile Broadband information provided with your computer or the mobile network operator may provide it separately from the computer.

For information about inserting and removing the SIM, see Inserting and removing a SIM on page 22 section in this chapter.

For information about HP Mobile Broadband and how to activate service with a preferred mobile network operator, see the HP Mobile Broadband information included with your computer. For additional information, see the HP website at http://www.hp.com/go/mobilebroadband (select regions/countries only).

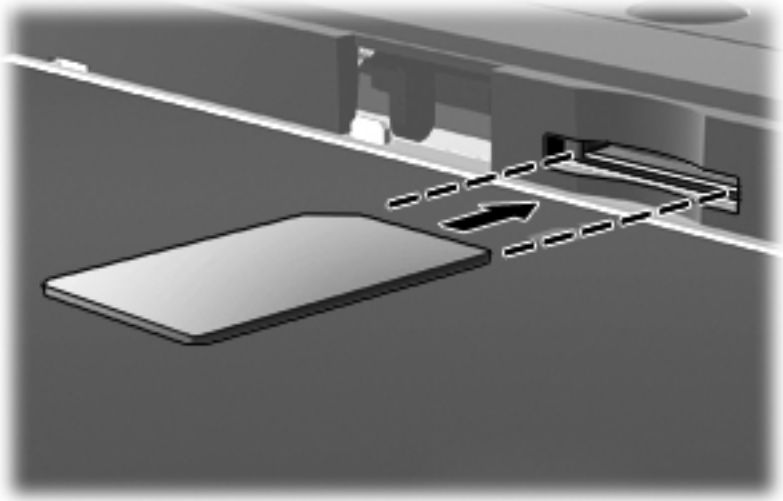
Inserting and removing a SIM

CAUTION: To prevent damage to the connectors, use minimal force when inserting a SIM.

To insert a SIM, follow these steps:

1. Shut down the computer.
2. Close the display.
3. Disconnect all external devices connected to the computer.
4. Unplug the power cord from the AC outlet.
5. Turn the computer upside down on a flat surface, with the battery bay toward you.
6. Remove the battery. See Inserting or removing the battery on page 41 for more details.
7. Insert the SIM into the SIM slot, and gently push the SIM into the slot until it is firmly seated.

NOTE: See the image on the battery bay to determine which way the SIM card should be inserted into your computer.



8. Replace the battery. Inserting or removing the battery on page 41 for more details.

NOTE: HP Mobile Broadband will be disabled if the battery is not replaced.

9. Reconnect external power.
10. Reconnect external devices.
11. Turn on the computer.

To remove a SIM, press in on the SIM, and then remove it from the slot.

Using Bluetooth wireless devices

A Bluetooth device provides short-range wireless communications that replace the physical cable connections that traditionally link electronic devices such as the following:

- Computers (desktop, notebook, PDA)
- Phones (cellular, cordless, smart phone)
- Imaging devices (printer, camera)
- Audio devices (headset, speakers)
- Mouse

Bluetooth devices provide peer-to-peer capability that allows you to set up a personal area network (PAN) of Bluetooth devices. For information about configuring and using Bluetooth devices, see the Bluetooth software Help.

Connecting to a wired network

There are 2 kinds of wired connections: local area network (LAN) and modem connection. A LAN connection uses a network cable and is much faster than a modem, which uses a telephone cable. Both cables are sold separately.

WARNING! To reduce the risk of electric shock, fire, or damage to the equipment, do not plug a modem cable or telephone cable into an RJ-45 (network) jack.

Connecting to a local area network (LAN)

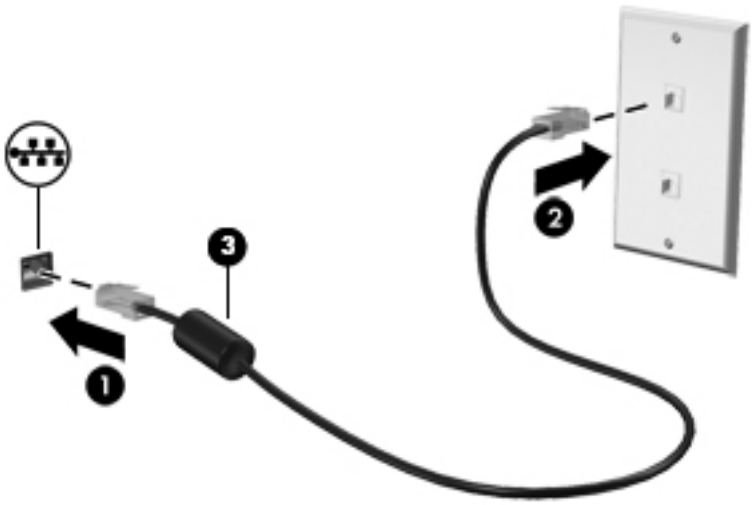
Use a LAN connection if you want to connect the computer directly to a router in your home (instead of working wirelessly), or if you want to connect to an existing network at your office.

Connecting to a LAN requires an 8-pin, RJ-45 network cable.

To connect the network cable, follow these steps:

1. Plug the network cable into the network jack **(1)** on the computer.
2. Plug the other end of the network cable into a network wall jack **(2)** or router.

NOTE: If the network cable contains noise suppression circuitry **(3)**, which prevents interference from TV and radio reception, orient the circuitry end of the cable toward the computer.



Using a modem

A modem must be connected to an analog telephone line using a 6-pin, RJ-11 modem cable. In some countries or regions, a specific modem cable adapter is also required. Jacks for digital PBX systems may resemble analog telephone jacks, but they are not compatible with the modem.

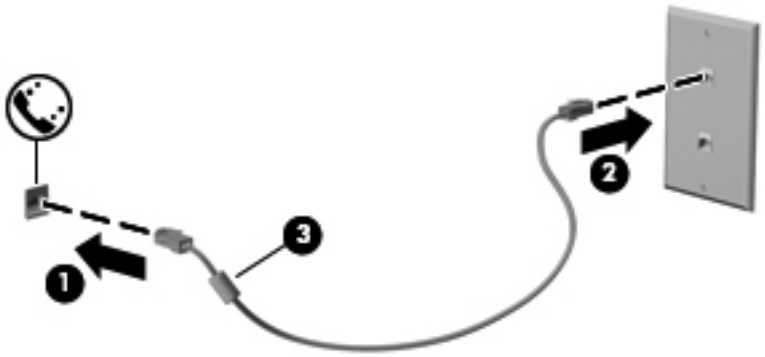
Connecting a modem cable

To connect the modem cable, follow these steps:

1. Plug the modem cable into the modem jack **(1)** on the computer.

2. Plug the modem cable into the RJ-11 telephone wall jack **(2)**.

NOTE: If the modem cable contains noise suppression circuitry **(3)**, which prevents interference from TV and radio reception, orient the circuitry end of the cable toward the computer.

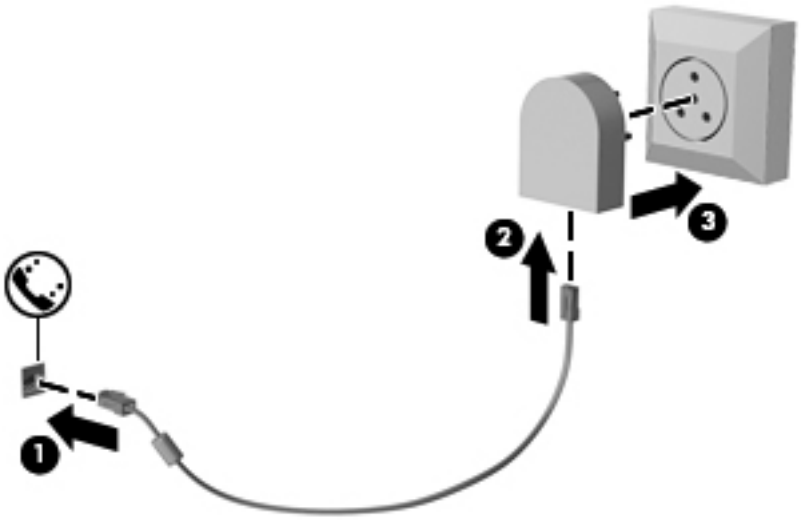


Connecting a country- or region-specific modem cable adapter

Telephone jacks vary by country or region. To use the modem and the modem cable outside the country or region in which you purchased the computer, you must obtain a country- or region-specific modem cable adapter.

To connect the modem to an analog telephone line that does not have an RJ-11 telephone jack, follow these steps:

1. Plug the modem cable into the modem jack **(1)** on the computer.
2. Plug the modem cable into the modem cable adapter **(2)**.
3. Plug the modem cable adapter **(3)** into the telephone wall jack.



4 Pointing devices and keyboard

Using pointing devices

NOTE: In addition to the pointing devices included with your computer, you can use an external USB mouse (purchased separately) by connecting it to one of the USB ports on the computer.

Setting pointing device preferences

Use Mouse Properties in Windows to customize settings for pointing devices, such as button configuration, click speed, and pointer options.

To access Mouse Properties:

- From the Start screen, type `m`. In the search box, type `mouse`, click **Settings**, and then select **Mouse**.

Using the pointing stick

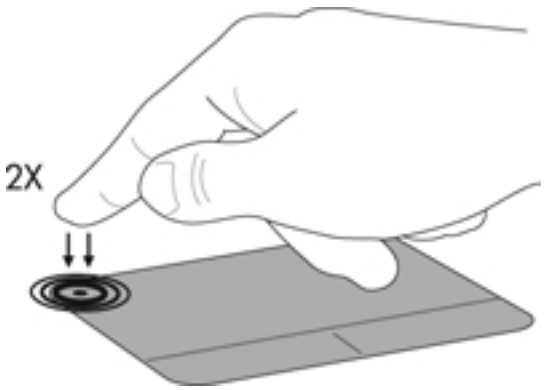
Press the pointing stick in the direction you want to move the pointer on the screen. Use the left and right pointing stick buttons as you would the left and right buttons on an external mouse.

Using the TouchPad

To move the pointer, slide one finger across the TouchPad in the direction you want the pointer to go. Use the left and right TouchPad buttons like the buttons on an external mouse.

Turning the TouchPad off and on

To turn the TouchPad off and on, quickly double-tap the TouchPad on/off button.



Using TouchPad Gestures

Your TouchPad or touch screen (select models only), allows you to navigate the pointing device on the screen by using your fingers to control the pointer action.

TIP: For touch screen computers, you may perform the gestures on the display, on the TouchPad or a combination of the two.

The TouchPad supports a variety of gestures. To use TouchPad gestures, place two fingers on the TouchPad at the same time.

NOTE: TouchPad gestures are not supported in all programs.

1. From the Start screen type `mouse`, click **Settings**, and then select **Mouse** from the list of applications.
2. Click the **Device Settings** tab, select the device in the window that is displayed, and then click **Settings**.
3. Click a gesture to activate the demonstration.

To turn the gestures off or on:

1. From the Start screen type, `mouse`, click **Settings**, and then select **Mouse** from the list of applications.
2. Click the **Device Settings** tab, select the device in the window that is displayed, and then click **Settings**.
3. Select the check box next to the gesture that you want to turn off or on.
4. Click **Apply**, and then click **OK**.

Tapping

To make an on-screen selection, point to an item on the screen and then tap.

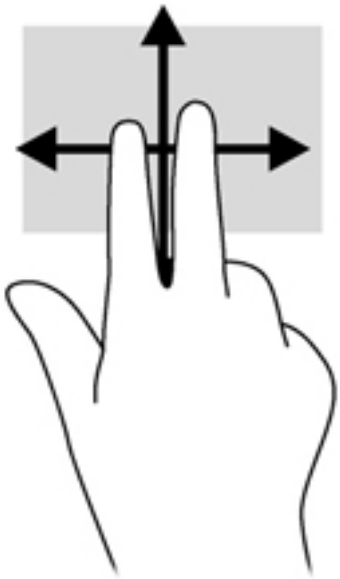
- Tap one finger on the TouchPad zone to make a selection. Double-tap an item to open it.

NOTE: Press and hold on the TouchPad to open a help screen that provides information about the selected item.

Scrolling

Scrolling is useful for moving up, down, or sideways on a page or image.

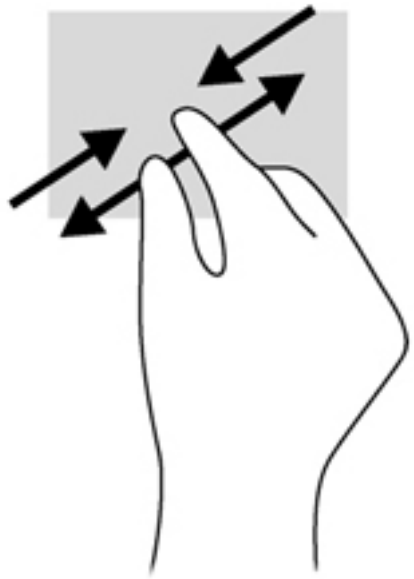
- Place two fingers slightly apart on the TouchPad zone and then drag them up, down, left, or right.



Pinching/zooming

Pinching and zooming allow you to zoom out or in on images or text.

- Zoom in by placing two fingers together on the TouchPad zone and then moving your fingers apart.
- Zoom out by placing two fingers apart on the TouchPad zone and then moving your fingers together.

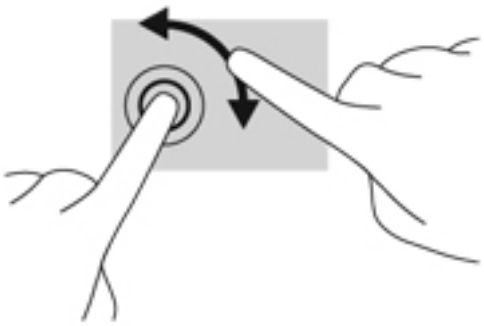


Rotating (select models only)

Rotating allows you to turn items such as photos.

- Point to an object and then anchor the forefinger of your left hand in the TouchPad zone. Using your right hand, slide your forefinger in a sweeping motion from 12 o’clock to 3 o’clock. To reverse the rotation, move your forefinger from 3 o’clock to 12 o’clock.

NOTE: Rotate is intended for specific apps where you can manipulate an object or image. It may not be functional for all apps.



Using the keyboard

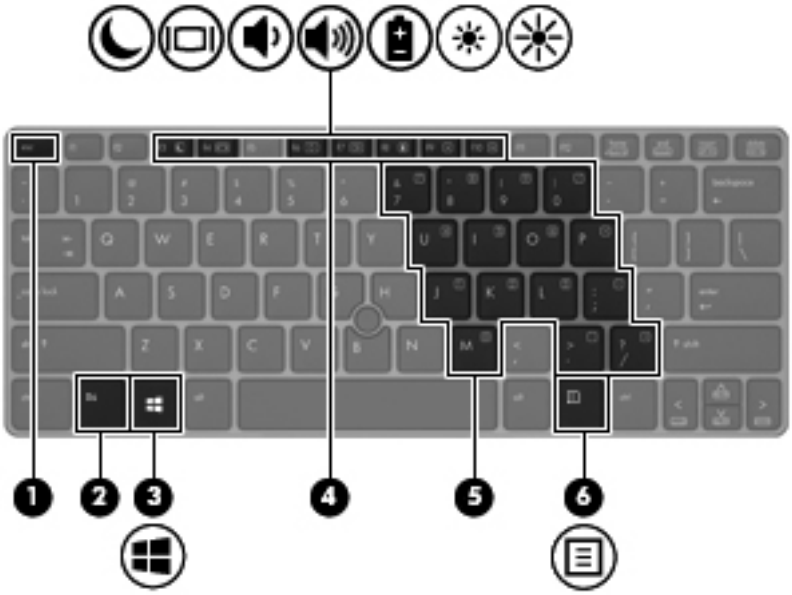
The keyboard and mouse allow you to type, select items, scroll and to perform the same functions as using touch gestures. The keyboard also allows you to use action keys and hot keys to perform specific functions .

TIP: The Windows logo key on the keyboard allows you to quickly return to the Start screen from an open app or the desktop. Pressing the Windows logo key again will return you to the previous screen.

NOTE: Depending on the country or region, your keyboard may have different keys and keyboard functions than those discussed in this section.

Identifying the hot keys

A hot key is a combination of the fn key **(2)** and either the esc key **(1)**, or one of the function keys **(4)**.



To use a hot key:

▲ Briefly press the fn key, and then briefly press the second key of the hot key combination.

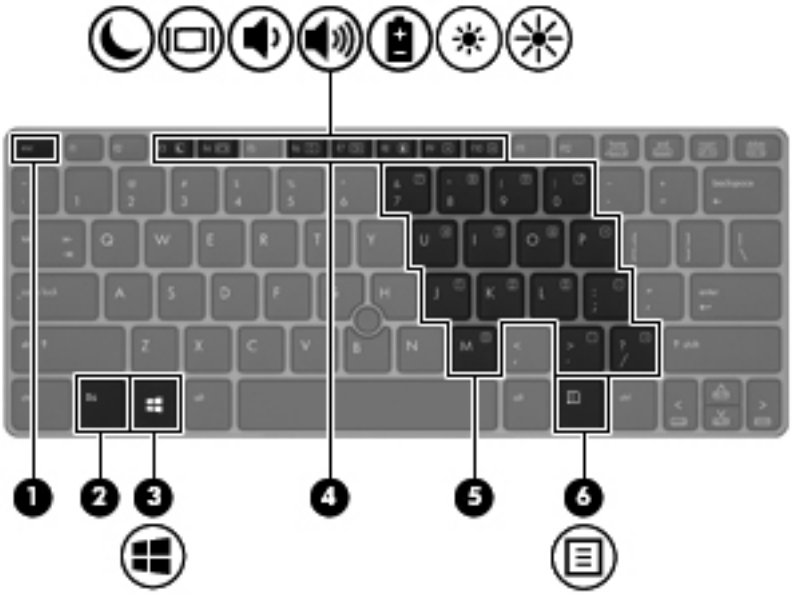
Hot key combination		Description
	fn+esc	Displays system information.
	fn+f3	Initiates Sleep, which saves your information in system memory. The display and other system components turn off and power is conserved. To exit Sleep, briefly press the power button. **CAUTION:** To reduce the risk of information loss, save your work before initiating Sleep.
	fn+f4	Switches the screen image among display devices connected to the system. For example, if a monitor is connected to the computer, fn+f4 alternates the screen image from computer display to monitor display to simultaneous display on both the computer and the monitor. Most external monitors receive video information on the computer using the external VGA video standard. The fn+f4 hotkey can also alternate images among other devices that are receiving video information on the computer.
	fn+f6	Decreases speaker volume.
	fn+f7	Increases speaker volume.
	fn+f8	Launches HP Power Assistant. Displays charge information for all installed batteries. The display indicates which batteries are charging and reports the amount of charge remaining in each battery.

Hot key combination		Description
	fn+f9	Decreases the screen brightness level.
	fn+f10	Increases the screen brightness level.

Using keypads

The computer includes an embedded numeric keypad. The computer also supports an optional external numeric keypad, or an optional external keyboard that includes a numeric keypad.

Using the embedded numeric keypad



	Component	Description
(2)	fn key	Turns the embedded numeric keypad on and off when pressed in combination with the num lk key. **NOTE:** The embedded numeric keypad will not function while an external keyboard or numeric keypad is connected to the computer.
(5)	Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.

Turning the embedded numeric keypad on and off

Press fn+num lk to turn on the embedded numeric keypad. Press fn+num lk again to turn off the keypad.

NOTE: The embedded numeric keypad is turned off while an external keyboard or numeric keypad is connected to the computer.

Switching key functions on the embedded numeric keypad

You can temporarily alternate the functions of keys on the embedded numeric keypad between their standard keyboard functions and their keypad functions:

- To use the navigational function of a keypad key while the keypad is off, press and hold the fn key while pressing the keypad key.
- To use the standard function of a keypad key while the keypad is on:
  - Press and hold the fn key to type in lowercase.
  - Press and hold fn+shift to type in uppercase.

Using an optional external numeric keypad

Keys on most external numeric keypads function differently according to whether num lock is on or off. (Num lock is turned off at the factory.) For example:

- When num lock is on, most keypad keys type numbers.
- When num lock is off, most keypad keys function like the arrow, page up, or page down keys.

When num lock on an external keypad is turned on, the num lock light on the computer is turned on. When num lock on an external keypad is turned off, the num lock light on the computer is turned off.

To turn num lock on or off on an external keypad as you work:

▲ Press the num lk key on the external keypad, not on the computer.

5 Multimedia

Your computer may include the following:

- Integrated speaker(s)
- Integrated microphone(s)
- Integrated webcam
- Preinstalled multimedia software
- Multimedia buttons or keys

Using the media activity controls

Depending on your computer model, you may have the following media activity controls that allow you to play, pause, fast forward, or rewind a media file:

- Media buttons
- Media hotkeys (specific keys pressed in combination with the fn key)
- Media keys

Audio

On your HP computer, you can play music CDs, download and listen to music, stream audio content from the web (including radio), record audio, or mix audio and video to create multimedia. To enhance your listening enjoyment, attach external audio devices such as speakers or headphones.

Connecting speakers

You can attach wired speakers to your computer by connecting them to a USB port (or the audio-out jack) on your computer or on a docking station.

To connect wireless speakers to your computer, follow the device manufacturer's instructions. Before connecting audio devices, be sure to adjust the volume.

Connecting headphones

You can connect wired headphones to the headphone jack on your computer.

To connect wireless headphones to your computer, follow the device manufacturer's instructions.

WARNING! To reduce the risk of personal injury, lower the volume setting before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety and Environmental Notices*.

Connecting a microphone

To record audio, connect a microphone to the microphone jack on the computer. For best results when recording, speak directly into the microphone and record sound in a setting free of background noise.

Adjusting the volume

Depending on your computer model, you can adjust the volume using the following:

- Volume buttons
- Volume hot keys (specific keys pressed in combination with the fn key)
- Volume keys

WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety and Environmental Notices*. To access this guide, from the Start screen, type HP, select **HP Support Assistant**, select **My computer** and then select the **User guides**.

NOTE: Volume can also be controlled through the operating system and some programs.

NOTE: Refer to Getting to know your computer on page 4 for information on what type of volume controls your computer has.

Checking audio functions on the computer

NOTE: For best results when recording, speak directly into the microphone and record sound in a setting free of background noise.

To check the audio functions on your computer, follow these steps:

1. From the Start screen, type c, and then select **Control Panel** from the list of applications.
2. Select **Hardware and Sound**, and then select **Sound**.

   When the Sound window opens, select the **Sounds** tab. Under **Program Events**, select any sound event, such as a beep or alarm and then click **Test**.

To check the recording functions on your computer, follow these steps:

1. From the Start screen, type s, and then select **Sound Recorder**.
2. Click **Start Recording** and speak into the microphone. Save the file to your desktop.
3. Open a multimedia program and play back the recording.

To confirm or change the audio settings on your computer:

1. From the Start screen, type c, and then select **Control Panel** from the list of applications.
2. Select **Hardware and Sound**, and then select **Sound**.

Webcam (select models only)

Some computers include an integrated webcam. With the preinstalled software, you can use the webcam to take a photo or record a video. You can preview and save the photo or video recording.

The webcam software enables you to experiment with the following features:

- Capturing and sharing video
- Streaming video with instant message software
- Taking still photos

Administrators can set the security level for Face Recognition in the Security Manager Setup Wizard or *HP ProtectTools Administrative Console*.To access this guide, from the Start screen, type `HP`, select **HP Support Assistant**, select **computer** and then select the **User guides**. For details about using the webcam, refer to the help for the app.

Video

Your computer may have one or more of the following external video ports:

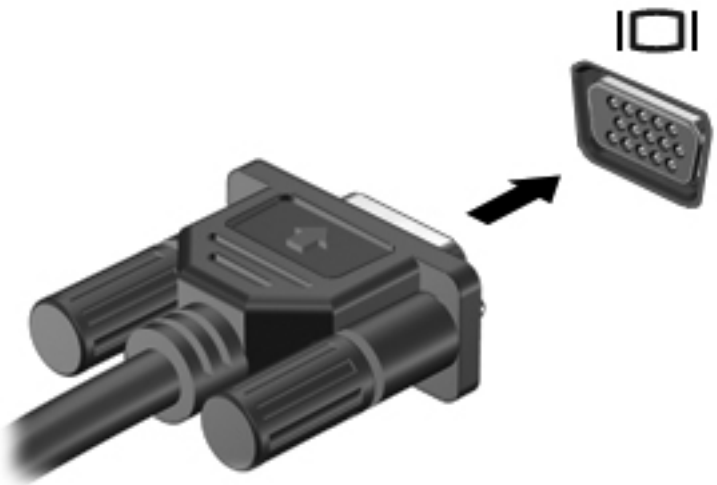
- VGA
- HDMI (High Definition Multimedia Interface)
- DisplayPort

NOTE: Refer to Getting to know your computer on page 4 for information about your computer's video ports.

VGA

The external monitor port, or VGA port, is an analog display interface that connects an external VGA display device such as an external VGA monitor or a VGA projector to the computer.

▲ To connect a VGA display device, connect the device cable to the external monitor port.



DisplayPort (select models only)

The DisplayPort connects the computer to an optional video or audio device, such as a high-definition television, or to any compatible digital or audio component. The DisplayPort delivers higher performance than the VGA external monitor port and improves digital connectivity.

NOTE: To transmit video and/or audio signals through the DisplayPort, you need a DisplayPort cable (purchased separately).

NOTE: One DisplayPort device can be connected to the DisplayPort port on the computer. The information displayed on the computer screen can be simultaneously displayed on the DisplayPort device.

To connect a video or audio device to the DisplayPort:

1. Connect one end of the DisplayPort cable to the DisplayPort port on the computer.
2. Connect the other end of the cable to the video device, and then see the device manufacturer's instructions for additional information.

NOTE: To remove the device cable, press down on connector release button to disconnect it on the computer.

6 Power management

NOTE: A computer may have a power button or a power switch. The term *power button* is used throughout this guide to see both types of power controls.

Shutting down the computer

CAUTION: Unsaved information is lost when the computer shuts down.

The shutdown command closes all open programs, including the operating system, and then turns off the display and computer.

Shut down the computer under any of the following conditions:

- When you need to replace the battery or access components inside the computer
- When you are connecting an external hardware device that does not connect to a Universal Serial Bus (USB) port
- When the computer will be unused and disconnected from external power for an extended period

Although you can turn off the computer with the power button, the recommended procedure is to use the Windows shutdown command:

NOTE: If the computer is in the Sleep state or in Hibernation, you must first exit Sleep or Hibernation before shutdown is possible by briefly pressing the power button.

1. Save your work and close all open programs.
2. From the Start screen, point to the upper-right or lower-right corner of the screen.
3. Click **Settings**, click the **Power** icon, and then click **Shut down**.

If the computer is unresponsive and you are unable to use the preceding shutdown procedure, try the following emergency procedures in the sequence provided:

- Press ctrl+alt+delete. Click the **Power** icon, and then click **Shut Down**.
- Press and hold the power button for at least 5 seconds.
- Disconnect the computer from external power.
- On models with a user-replaceable battery, remove the battery.

Setting power options

Using power-saving states

Sleep is enabled at the factory.

When Sleep is initiated, the power lights blink and the screen clears. Your work is saved to memory.

CAUTION: To reduce the risk of possible audio and video degradation, loss of audio or video playback functionality, or loss of information, do not initiate Sleep while reading from or writing to a disc or an external media card.

NOTE: You cannot initiate any type of networking connection or perform any computer functions while the computer is in the Sleep state.

Initiating and exiting Sleep

With the computer on, you can initiate Sleep in any of the following ways:

- Briefly press the power button.
- From the Start screen, point to the upper-right or lower-right corner of the screen. When the charms list opens, click **Settings**, click the **Power** icon, and then click **Sleep**.

To exit Sleep, briefly press the power button.

When the computer exits Sleep, the power lights turn on and the computer returns to the screen where you stopped working.

NOTE: If you have set a password to be required on wakeup, you must enter your Windows password before the computer will return to the screen.

Enabling and exiting user-initiated hibernation

You can enable user-initiated Hibernation and change other power settings and timeouts using Power Options:

1. From the Start screen, type `power`, select **Settings**, and then select **Power Options**.
2. In the left pane, click **Choose what the power button does**.
3. Click **Change Settings that are currently unavailable**.
4. In the **When I press the power button** area, select **Hibernate**.
5. Click **Save changes**.

To exit Hibernation, briefly press the power button. The power lights turn on and your work returns to the screen where you stopped working.

NOTE: If you have set a password to be required on wakeup, you must enter your Windows password before your work will return to the screen.

Setting password protection on wakeup

To set the computer to prompt for a password when the computer exits Sleep or Hibernation, follow these steps:

1. From the Start screen, type `power`, select **Settings**, and then select **Power Options**.
2. In the left pane, click **Require a password on wakeup**.
3. Click **Change Settings that are currently unavailable**.
4. Click **Require a password (recommended)**.

NOTE: If you need to create a user account password or change your current user account password, click **Create or change your user account password**, and then follow the on-screen instructions. If you do not need to create or change a user account password, go to step 5.

5. Click **Save changes**.

Using the power meter

The power meter is located in the notification area, at the far right of the taskbar. The power meter allows you to quickly access power settings and view the remaining battery charge.

- To display the percentage of remaining battery charge and the current power plan, move the pointer over the power meter icon.
- To access Power Options, or to change the power plan, click the power meter icon and select an item from the list.

Different power meter icons indicate whether the computer is running on battery or external power. The icon also displays a message if the battery has reached a low or critical battery level.

Using the power meter and power settings

The power meter is located on the Windows desktop. The power meter allows you to quickly access power settings and view the remaining battery charge.

- To display the percentage of remaining battery charge and the current power plan, on the Windows desktop, point over the power meter icon.
- To use Power Options, or to change the power plan, click the power meter icon and select an item from the list. From the Start screen, you can also type `power`, select **Settings**, and then select **Power Options**.

Different power meter icons indicate whether the computer is running on battery or external power. The icon also displays a message if the battery has reached a low or critical battery level.

Using battery power

WARNING! To reduce potential safety issues, use only the battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

The computer runs on battery power whenever it is not plugged into external AC power. Computer battery life varies, depending on power management settings, running programs, display brightness, external devices connected to the computer, and other factors. Keeping the battery in the computer whenever the computer is plugged into AC power charges the battery and also protects your work in

case of a power outage. If the computer contains a charged battery and is running on external AC power, the computer automatically switches to battery power if the AC adapter is disconnected on the computer or an AC power loss occurs.

NOTE: When you disconnect AC power, the display brightness is automatically decreased to save battery life. Select computer models can switch between graphic modes to increase battery life. For more information, see Switchable graphics/dual graphics (select models only) on page 44.

Finding additional battery information

The HP Support Assistant app provides the tools and information about the battery. To access battery information, from the Start screen, type `HP`, select **HP Support Assistant**, and then select **Battery and performance**.

- Battery Check tool to test battery performance
- Information on calibration, power management, and proper care and storage to maximize battery life
- Information on battery types, specifications, life cycles, and capacity

To access battery information:

▲ To access battery information, from the Start screen, type `HP`, select **HP Support Assistant**, and then select **Battery and performance**.

Using Battery Check

Help and Support provides information on the status of the battery installed in the computer.

To run Battery Check:

1. Connect the AC adapter to the computer.

NOTE: The computer must be connected to external power for Battery Check to work properly.

2. To access battery information, from the Start screen, type `HP`, select **HP Support Assistant**, and then select **Battery and performance**.

Battery Check examines the battery and its cells to see if they are functioning properly, and then reports the results of the examination.

Displaying the remaining battery charge

▲ Move the pointer over the power meter icon in the notification area, at the far right of the taskbar.

Maximizing battery discharge time

Battery discharge time varies depending on features you use while on battery power. Maximum discharge time gradually decreases as the battery storage capacity naturally degrades.

Tips for maximizing battery discharge time:

- Lower the brightness on the display.
- Remove the battery on the computer when it is not being used or charged, if the computer contains a user-replaceable battery

- Store the user-replaceable battery in a cool, dry location.
- Select the **Power saver** setting in Power Options.

Managing low battery levels

The information in this section describes the alerts and system responses set at the factory. Some low-battery alerts and system responses can be changed using Power Options. Preferences set using Power Options do not affect lights.

From the Start screen, type `power`, select **Settings**, and then select **Power Options**.

Identifying low battery levels

When a battery that is the sole power source for the computer reaches a low or critical battery level, the following behavior occurs:

- The battery light (select models only) indicates a low or critical battery level.

– or –

- The power meter icon in the notification area shows a low or critical battery notification.

NOTE: For additional information about the power meter, see Using the power meter on page 39.

If the computer is on or in the Sleep state, the computer remains briefly in the Sleep state, and then shuts down and loses any unsaved information.

Resolving a low battery level

Resolving a low battery level when external power is available

▲ Connect one of the following devices:

- AC adapter
- Optional docking or expansion device
- Optional power adapter purchased as an accessory from HP

Resolving a low battery level when no power source is available

To resolve a low battery level when no power source is available, save your work and shut down the computer.

Inserting or removing the battery

Inserting a battery

To insert the battery:

▲ Insert the battery into the battery bay until it is seated, **(1)**.

The battery release latch on the left automatically holds the battery in position **(2)**. Slide the latch to lock the battery into place.

Removing a battery

To remove the battery:

⚠ **CAUTION:** Removing a battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work and shut down the computer through Windows before removing the battery.

▲ Slide the battery release latch on the left **(1)**, and then remove the battery **(2)**.

Conserving battery power

- From the Start screen, type `power`, select **Settings**, and then select **Power Options**.
- Select low power-use settings through Power Options.
- Turn off wireless and LAN connections and exit modem applications when you are not using them.
- Disconnect unused external devices that are not plugged into an external power source.
- Stop, disable, or remove any external media cards that you are not using.
- Decrease screen brightness.
- Before you leave your work, initiate Sleep, or shut down the computer.

Storing a user-replaceable battery (select models only)

⚠ **CAUTION:** To reduce the risk of damage to a battery, do not expose it to high temperatures for extended periods of time.

If a computer will be unused and unplugged from external power for more than 2 weeks, remove the user-replaceable battery and store it separately.

To prolong the charge of a stored battery, place it in a cool, dry place.

NOTE: A stored battery should be checked every 6 months. If the capacity is less than 50 percent, recharge the battery before returning it to storage.

Calibrate a battery before using it if it has been stored for one month or more.

Disposing of a user-replaceable battery (select models only)

WARNING! To reduce the risk of fire or burns, do not disassemble, crush, or puncture; do not short external contacts; do not dispose of in fire or water.

See the *Regulatory, Safety and Environmental Notices* for proper battery disposal. To access this guide, from the Start screen, type `HP`, select **HP Support Assistant**, select **computer** and then select the **User guides**.

Replacing a user-replaceable battery (select models only)

Battery Check in Help and Support notifies you to replace the battery when an internal cell is not charging properly or when the battery storage capacity has reached a weak condition. If the battery is possibly covered by an HP warranty, instructions include a warranty ID. A message refers you to the HP website for more information about ordering a replacement battery.

Using external AC power

WARNING! Do not charge the computer battery while you are onboard aircraft.

WARNING! To reduce potential safety issues, use only the AC adapter provided with the computer, a replacement AC adapter provided by HP, or a compatible AC adapter purchased from HP.

NOTE: For information on connecting to AC power, see the *Setup Instructions* poster provided in the computer box.

External AC power is supplied through an approved AC adapter or an optional docking or expansion device.

Connect the computer to external AC power under any of the following conditions:

- When charging or calibrating a battery
- When installing or modifying system software
- When writing information to a CD, a DVD, or a BD (select models only)
- When running Disk Defragmenter
- When performing a backup or recovery

When you connect the computer to external AC power, the following events occur:

- The battery begins to charge.
- If the computer is turned on, the power meter icon in the notification area changes appearance.

When you disconnect external AC power, the following events occur:

- The computer switches to battery power.
- The display brightness is automatically decreased to save battery life.

Testing an AC adapter

Test the AC adapter if the computer exhibits any of the following symptoms when it is connected to AC power:

- The computer does not turn on.
- The display does not turn on.
- The power lights are off.

To test the AC adapter:

NOTE: The following instructions apply to computers with user-replaceable batteries.

1. Shut down the computer.
2. Remove the battery on the computer.
3. Connect the AC adapter to the computer, and then plug it into an AC outlet.
4. Turn on the computer.
   - If the power lights turn *on*, the AC adapter is working properly.
   - If the power lights remain *off*, the AC adapter is not functioning and should be replaced.

Contact support for information on obtaining a replacement AC power adapter.

Switchable graphics/dual graphics (select models only)

Select computers are equipped with either switchable graphics or dual graphics.

- Switchable graphics—Supported by both AMD™ and Intel. If your computer has AMD dynamic switchable graphics, it supports only switchable graphics.
- Dual graphics—Supported only by AMD. If your computer has AMD Radeon dual graphics, it supports only dual graphics.

NOTE: Dual graphics can be enabled only by full-screen applications that use DirectX version 10 or 11.

NOTE: To determine whether your computer supports switchable graphics or dual graphics, see your notebook graphics processor configuration. Intel HR Central Processing Units (CPUs) and AMD Trinity series Accelerated Processing Units (APUs) support switchable graphics. AMD Trinity series A6, A8, and A10 APUs support dual graphics. AMD Trinity series A4 APUs do not support dual graphics.

Both switchable graphics and dual graphics offer two modes for processing graphics:

- Performance mode—Runs application with optimal performance.
- Power Saving mode—Conserves battery life.

To manage your AMD graphics settings:

1. Open the Catalyst Control Center by right-clicking on the Windows desktop, and then select **Configure Switchable Graphics**.
2. Click the **Power** tab, and then select **Switchable Graphics**.

Using switchable graphics (select models only)

Switchable graphics allow you to switch between Performance mode and Power Saving mode.

To manage your switchable graphics settings:

1. From the Windows desktop, right-click on the desktop, and then select **Configure Switchable Graphics**.
2. Click the **Power** tab, and then select **Switchable Graphics**.

Switchable graphics assigns individual applications to either Performance mode or Power Saving mode, based on power requirements. You can also manually modify the settings for an individual application by locating the application under **Recent Applications** drop-down menu, or by clicking **Browse**, located below **Other Applications**. You can switch between Performance mode and Power Saving mode.

NOTE: For more information, see the switchable graphics software Help.

7 External cards and devices

Using Media Card Reader cards (select models only)

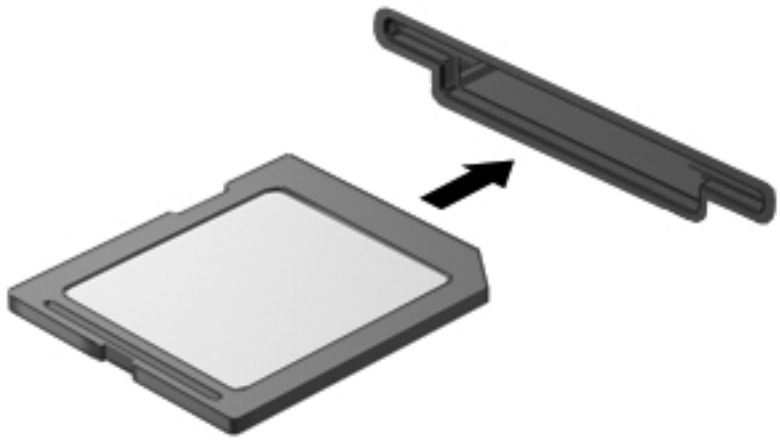
Optional digital cards provide secure data storage and convenient data sharing. These cards are often used with digital media–equipped cameras and PDAs as well as with other computers.

To determine the digital card formats that are supported on your computer, see Getting to know your computer on page 4.

Inserting a digital card

⚠ **CAUTION:** To reduce the risk of damage to the digital card connectors, use minimal force to insert a digital card.

1. Hold the card label-side up, with the connectors facing the computer.
2. Insert the card into the Media Card Reader, and then press in on the card until it is firmly seated.

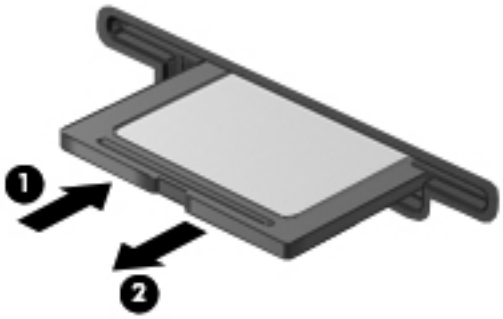


You will hear a sound when the device has been detected, and a menu of options may be displayed.

Removing a digital card

CAUTION: To reduce the risk of loss of data or an unresponsive system, use the following procedure to safely remove the digital card.

1. Save your information and close all programs associated with the digital card.
2. Click the remove hardware icon in the notification area, at the far right of the taskbar. Then follow the on-screen instructions.
3. Press in on the card **(1)**, and then remove it from the slot **(2)**.



NOTE: If the card does not eject, pull the card out of the slot.

Using ExpressCards (select models only)

An ExpressCard is a high-performance PC Card that is inserted into the ExpressCard slot.

ExpressCards are designed to conform to the standard specifications of the Personal Computer Memory Card International Association (PCMCIA).

Configuring an ExpressCard

Install only the software required for the card. If you are instructed by the ExpressCard manufacturer to install device drivers:

- Install only the device drivers for your operating system.
- Do not install additional software, such as card services, socket services, or enablers, that are supplied by the ExpressCard manufacturer.

Inserting an ExpressCard

CAUTION: To prevent damage to the computer and external media cards, do not insert a PC Card into an ExpressCard slot.

CAUTION: To reduce the risk of damage to the connectors:

Use minimal force when inserting an ExpressCard.

Do not move or transport the computer when an ExpressCard is in use.

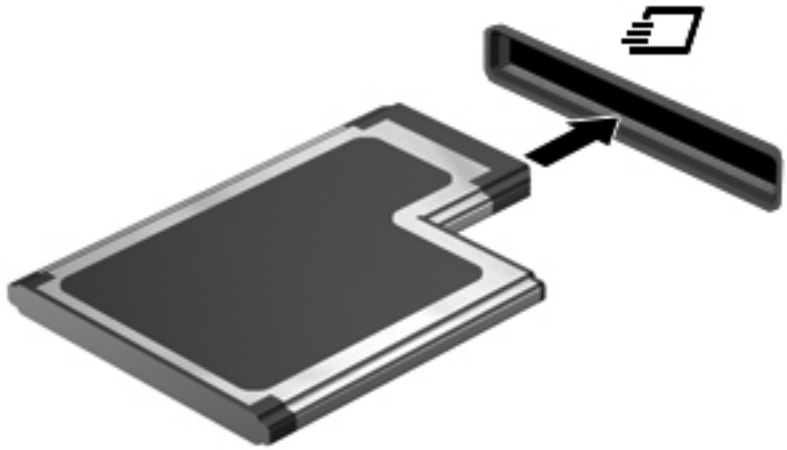
NOTE: The following illustration may look slightly different than your device.

The ExpressCard slot may contain a protective insert. To remove the insert:

1. Press in on the insert **(1)** to unlock it.
2. Pull the insert out of the slot **(2)**.

To insert an ExpressCard:

1. Hold the card label-side up, with the connectors facing the computer.
2. Insert the card into the ExpressCard slot, and then press in on the card until it is firmly seated.



You will hear a sound when the card has been detected, and a menu of options may be displayed.

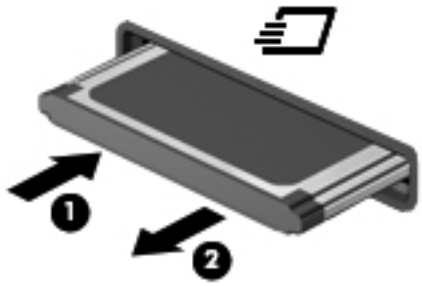
NOTE: The first time you connect an ExpressCard, a message in the notification area lets you know that the card is recognized by the computer.

NOTE: To conserve power, stop or remove an ExpressCard when it is not in use.

Removing an ExpressCard

CAUTION: To reduce the risk of loss of data or an unresponsive system, use the following procedure to safely remove the ExpressCard.

1. Save your information and close all programs associated with the ExpressCard.
2. Click the remove hardware icon in the notification area, at the far right of the taskbar, and then follow the on-screen instructions.
3. Release and remove the ExpressCard:
   a. Gently press in on the ExpressCard **(1)** to unlock it.
   b. Pull the ExpressCard out of the slot **(2)**.



Using smart cards (select models only)

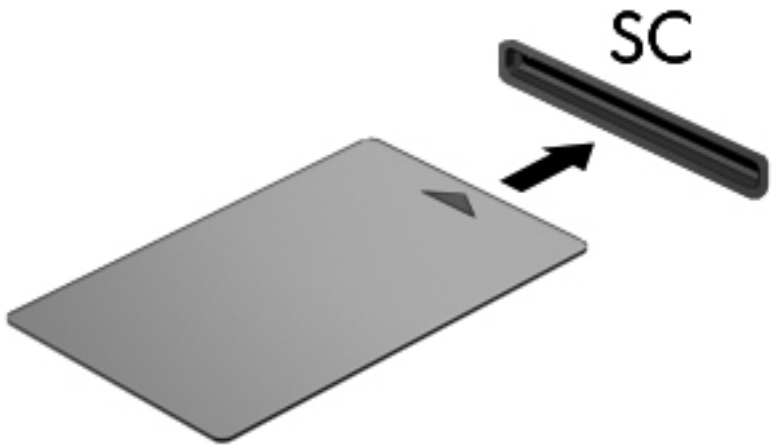
NOTE: The term *smart card* is used throughout this chapter to see both smart cards and Java™ Cards.

A smart card is a credit card-sized accessory that carries a microchip containing memory and a microprocessor. Like personal computers, smart cards have an operating system to manage input and output, and they include security features to protect against tampering. Industry-standard smart cards are used with the smart card reader (select models only).

A PIN is needed to gain access to the contents of the microchip. For more information about smart card security features, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

Inserting a smart card

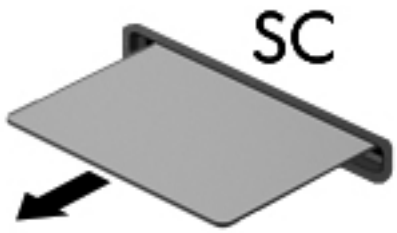
1. Hold the card label-side up, and gently slide the card into the smart card reader until the card is seated.



2. Follow the on-screen instructions for logging on to the computer using the smart card PIN.

Removing a smart card

▲ Grasp the edge of the smart card, and then pull it out of the smart card reader.



Using a USB device

Universal Serial Bus (USB) is a hardware interface that can be used to connect an optional external device, such as a USB keyboard, mouse, drive, printer, scanner, or hub.

Some USB devices may require additional support software, which is usually included with the device. For more information about device-specific software, see the manufacturer's instructions. These instructions may be provided with the software, on disc, or on the manufacturer’s website.

The computer has at least 1 USB port that supports USB 1.0, 1.1, 2.0, or 3.0 devices. Your computer may also have a USB charging port that provides power to an external device. An optional docking device or USB hub provides additional USB ports that can be used with the computer.

Connecting a USB device

CAUTION: To reduce the risk of damage to a USB connector, use minimal force to connect the device.

▲ Connect the USB cable for the device to the USB port.

NOTE: The following illustration may look slightly different than your computer.

You will hear a sound when the device has been detected.

NOTE: The first time you connect a USB device, a message in the notification area lets you know that the device is recognized by the computer.

Removing a USB device

CAUTION: To reduce the risk of damage to a USB connector, do not pull on the cable to remove the USB device.

CAUTION: To reduce the risk of loss of information or an unresponsive system, use the following procedure to safely remove the USB device.

1. To remove a USB device, save your information and close all programs associated with the device.
2. Click the remove hardware icon in the notification area, at the far right of the taskbar, and then follow the on-screen instructions.
3. Remove the device.

Using an eSATA device (select models only)

An eSATA port connects an optional high-performance eSATA component, such as an eSATA external hard drive.

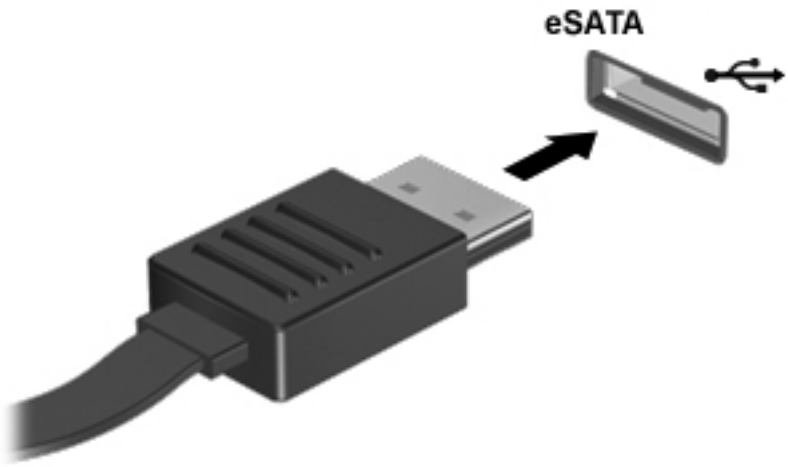
Some eSATA devices may require additional support software, which is usually included with the device. For more information about device-specific software, see the manufacturer's instructions.

NOTE: The eSATA port also supports an optional USB device.

Connecting an eSATA device

CAUTION: To reduce the risk of damage to an eSATA port connector, use minimal force to connect the device.

- To connect an eSATA device to the computer, connect the eSATA cable for the device to the eSATA port.



You will hear a sound when the device has been detected.

Removing an eSATA device

CAUTION: To reduce the risk of damage to an eSATA connector, do not pull on the cable to remove the eSATA device.

CAUTION: To reduce the risk of loss of information or an unresponsive system, use the following procedure to safely remove the device.

1. To remove an eSATA device, save your information and close all programs associated with the device.
2. Click the remove hardware icon in the notification area, at the far right of the taskbar, and then follow the on-screen instructions.
3. Remove the device.

Using optional external devices

NOTE: For more information about required software and drivers, or to learn which computer port to use, see the manufacturer's instructions.

To connect an external device to the computer:

CAUTION: To reduce the risk of damage to the equipment when connecting a powered device, be sure that the device is turned off and the AC power cord is unplugged.

1. Connect the device to the computer.
2. If you are connecting a powered device, plug the device power cord into a grounded AC outlet.
3. Turn off the device.

To disconnect an unpowered external device, turn off the device, and then disconnect it on the computer. To disconnect a powered external device, turn off the device, disconnect it on the computer, and then unplug the AC power cord.

Using optional external drives

Removable external drives expand your options for storing and accessing information. A USB drive can be added by connecting the drive to a USB port to the computer.

NOTE: HP external USB optical drives should be connected to the powered USB port to the computer.

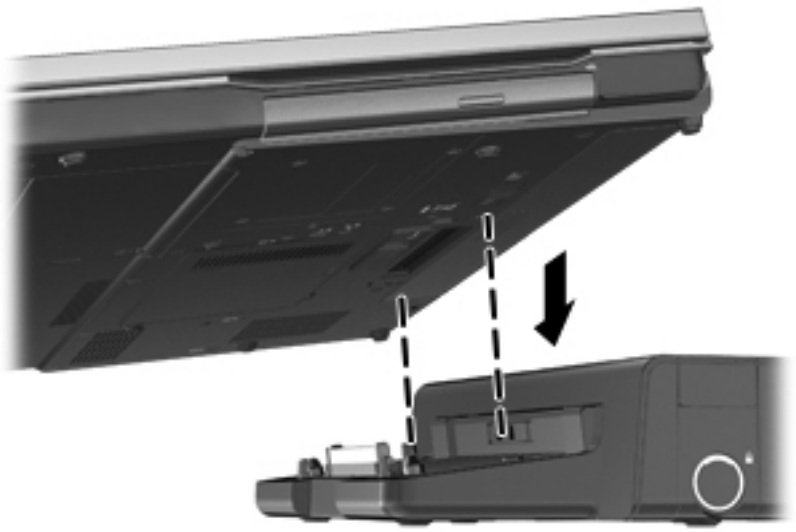
USB drives include the following types:

- 1.44-megabyte diskette drive
- Hard drive module
- External optical drive (CD, DVD, and Blu-ray)
- MultiBay device

Using the docking connector

The docking connector connects the computer to an optional docking device. An optional docking device provides additional ports and connectors that can be used with the computer.

NOTE: The following image may look slightly different than your computer or docking device.



8 Drives

Handling drives

⚠ **CAUTION:** Drives are fragile computer components that must be handled with care. Refer to the following cautions before handling drives. Additional cautions are included with the procedures to which they apply.

Observe these precautions:

- Before you move a computer that is connected to an external hard drive, initiate Sleep and allow the screen to clear, or properly disconnect the external hard drive.
- Before handling a drive, discharge static electricity by touching the unpainted metal surface of the drive.
- Do not touch the connector pins on a removable drive or on the computer.
- Handle a drive carefully; do not drop a drive or place items on it.
- Before removing or inserting a drive, shut down the computer. If you are unsure whether the computer is off, in the Sleep state, turn the computer on, and then shut it down through the operating system.
- Do not use excessive force when inserting a drive into a drive bay.
- Do not type on the keyboard or move the computer while an optical drive is writing to a disc. The write process is sensitive to vibration.
- When the battery is the only source of power, be sure that the battery is sufficiently charged before writing to media.
- Avoid exposing a drive to temperature or humidity extremes.
- Avoid exposing a drive to liquids. Do not spray the drive with cleaning products.
- Remove media from a drive before removing the drive from the drive bay, or traveling with, shipping, or storing a drive.
- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package “FRAGILE.”
- Avoid exposing a drive to magnetic fields. Security devices with magnetic fields include airport walk-through devices and security wands. Airport conveyer belts and similar security devices that check carry-on baggage use X-rays instead of magnetism and do not damage drives.

Using hard drives

CAUTION: To prevent information loss or an unresponsive system:

Save your work and shut down the computer before adding or replacing a memory module or hard drive.

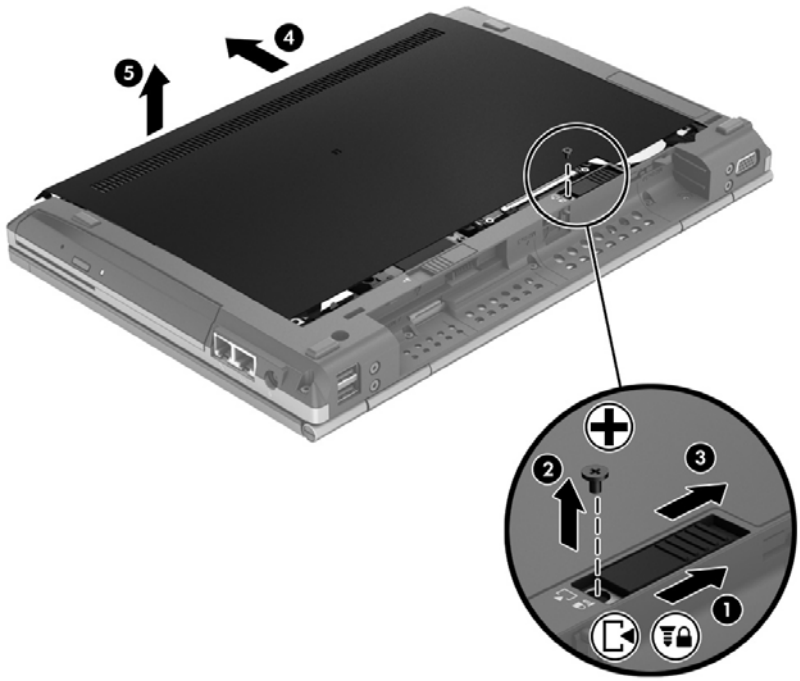
If you are not sure whether the computer is off or in Hibernation, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

Removing or replacing the service cover

Removing the service cover

Remove the service cover to access the memory module slot, hard drive, regulatory label, and other components.

1. Remove the battery (see Inserting or removing the battery on page 41).
2. Loosen and remove the service cover screw **(1)**.
3. Slide the service cover release latch to the right **(2)** to release the service cover.
4. Remove the service cover by sliding the service cover out **(3)** and lifting it away from the computer **(4)**.



To replace the service cover, reverse this procedure.

Replacing or upgrading the hard drive

CAUTION: To prevent information loss or an unresponsive system:

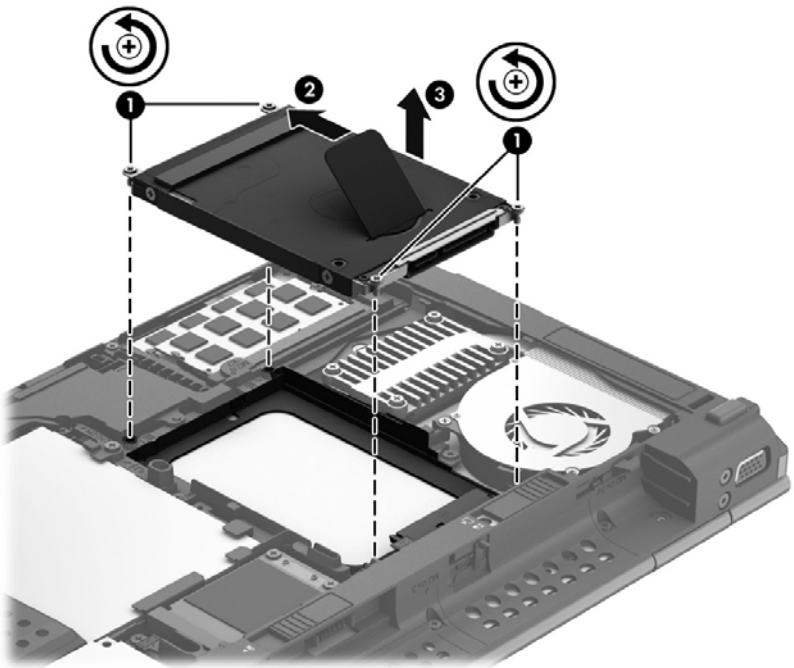
Shut down the computer before removing the hard drive from the hard drive bay. Do not remove the hard drive while the computer is on, in the Sleep state, or in Hibernation.

If you are not sure whether the computer is off or in Hibernation, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

Removing the hard drive

To remove a hard drive:

1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Turn the computer upside down on a flat surface.
4. Remove the battery (see Inserting or removing the battery on page 41).
5. Remove the service door (see Removing or replacing the service cover on page 55).
6. Remove the four hard drive screws **(1)**.
7. Grasp the tab and slide the drive to the left to pull away from the connector **(2)**, and then lift the drive up **(3)**.



To install a hard drive, reverse this procedure.

Improving hard drive performance

Using Disk Defragmenter

As you use the computer, files on the hard drive become fragmented. Disk Defragmenter consolidates the fragmented files and folders on the hard drive so that the system can run more efficiently.

NOTE: It is not necessary to run Disk Defragmenter on solid-state drives.

After you start Disk Defragmenter, it works without supervision. Depending on the size of your hard drive and the number of fragmented files, Disk Defragmenter may take more than an hour to complete. You may want to set it to run during the night or at another time when you do not need access to your computer.

HP recommends defragmenting your hard drive at least once a month. You may set Disk Defragmenter to run on a monthly schedule, but you can defragment your computer manually at any time.

To run Disk Defragmenter:

1. Connect the computer to AC power.
2. From the Start screen, type `disk`, click **Settings**, and then select **Defragment and optimize your drives**.
3. Click **Optimize**.

NOTE: Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support for more information. From the Start screen, type `h`, and then select **Help and Support**.

For additional information, access the Disk Defragmenter software Help.

Using Disk Cleanup

Disk Cleanup searches the hard drive for unnecessary files that you can safely delete to free up disk space and help the computer to run more efficiently.

To run Disk Cleanup:

1. From the Start screen, type `disk`, click **Settings**, and then select **Free disk space by deleting unnecessary files**.
2. Follow the on-screen instructions.

Using HP 3D DriveGuard (select models only)

HP 3D DriveGuard protects the hard drive by parking the drive and halting data requests under either of the following conditions:

- You drop the computer.
- You move the computer with the display closed while the computer is running on battery power.

A short time after the end of one of these events, HP 3D DriveGuard returns the hard drive to normal operation.

NOTE: Because solid-state drives (SSD) lack moving parts, HP 3D DriveGuard is unnecessary.

NOTE: Hard drives in the primary hard drive bay or in the secondary hard drive bay are protected by HP 3D DriveGuard. Hard drives installed in optional docking devices or connected to USB ports are not protected by HP 3D DriveGuard.

For more information, see the HP 3D DriveGuard software Help.

Identifying HP 3D DriveGuard status

The hard drive light on the computer changes color to show that a drive in the primary hard drive bay or a drive in the secondary hard drive bay (select models only) is parked. To determine whether drives are currently protected or whether a drive is parked, use the icon in the notification area, at the far right of the taskbar:

- If the software is enabled, a green check mark is superimposed over the hard drive icon.
- If the software is disabled, a red X is superimposed over the hard drive icon.
- If the drives are parked, a yellow moon is superimposed over the hard drive icon.

If the icon in the notification area is not enabled, follow these steps to enable it:

1. From the Start screen, type c, and then select **Control Panel**.
2. Select **Hardware and Sound > HP 3D DriveGuard**.

   NOTE: If prompted by User Account Control, click **Yes**.

3. From the **Icon in system tray** row, click **Show**.
4. Click **OK**.

Managing power with a parked hard drive

If HP 3D DriveGuard has parked the drive, the computer will behave in the following ways:

- The computer will not shut down.
- The computer will not activate battery alarms set on the Alarms tab in Power Options.

Before you move the computer, HP recommends that you either shut it down or initiate Sleep.

Using HP 3D DriveGuard software

The HP 3D DriveGuard software enables you to perform the following tasks:

- Enable and disable HP 3D DriveGuard.

  NOTE: Depending on your user privileges, you may be unable to enable or disable HP 3D DriveGuard. Privileges for non-administrator users can be changed by members of an administrator group.

- Determine whether a drive in the system is supported.

To open the software and change settings, follow these steps:

1. Double-click the icon in the notification area, at the far right of the taskbar.

   – or –

   Right-click the icon in the notification area, and then select **Settings**.

2. Click the appropriate button to change settings.
3. Click **OK**.

Using optical drives (select models only)

Optical drives include the following:

- CD
- DVD
- Blu-ray (BD)

Identifying the installed optical drive

▲ From the Start screen, type e, click **File Explorer**, and select **Computer**.

A list of all the devices installed in your computer, including your optical drive, is displayed.

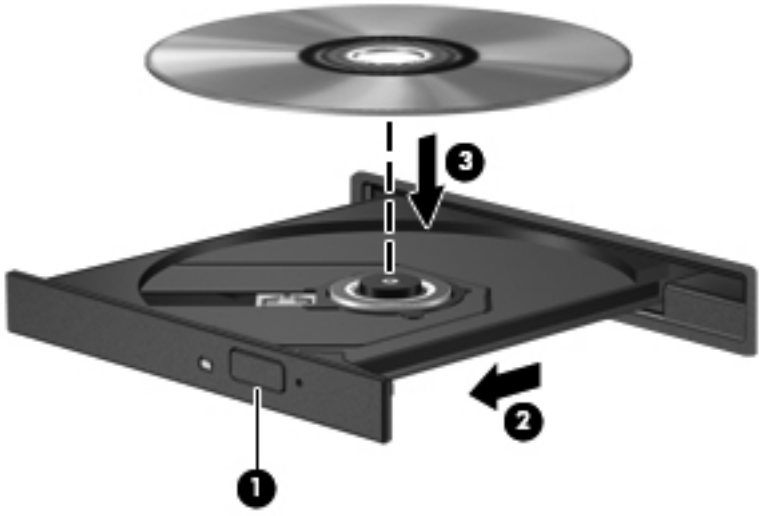
Inserting an optical disc

Tray-load

1. Turn on the computer.
2. Press the release button **(1)** on the drive bezel to release the disc tray.
3. Pull out the tray **(2)**.
4. Hold the disc by the edges to avoid touching the flat surfaces and position the disc label-side up over the tray spindle.

NOTE: If the tray is not fully accessible, tilt the disc carefully to position it over the spindle.

5. Gently press the disc **(3)** down onto the tray spindle until the disc snaps into place.



6. Close the disc tray.

NOTE: After you insert a disc, a short pause is normal. If you have not selected a media player, an AutoPlay dialog box opens. It prompts you to select how you want to use the media content.

Removing an optical disc

Tray-load

There are 2 ways to remove a disc, depending on whether the disc tray opens normally or not.

When the disc tray opens normally

1. Press the release button **(1)** on the drive bezel to release the disc tray, and then gently pull out the tray **(2)** until it stops.

2. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

NOTE: If the tray is not fully accessible, tilt the disc carefully as you remove it.

3. Close the disc tray and place the disc in a protective case.

When the disc tray fails to open normally

1. Insert the end of a paper clip **(1)** into the release access in the front bezel of the drive.
2. Press in gently on the paper clip until the tray is released, and then pull out the tray **(2)** until it stops.

3. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

NOTE: If the tray is not fully accessible, tilt the disc carefully as you remove it.

4. Close the disc tray and place the disc in a protective case.

Sharing optical drives

Although your computer may not have an integrated optical drive, you can access software and data, and install applications, by sharing an optical drive connected to another computer in your network. Sharing drives is a feature of the Windows operating system that allows a drive on one computer to be accessible to other computers on the same network.

NOTE: You must have a network set up in order to share an optical drive; see Connecting to a network on page 18 for additional information on setting up a network.

NOTE: Some discs, such as DVD movies and game discs, may be copy-protected and therefore unusable through DVD or CD drive sharing.

To share an optical drive from the computer with the optical drive you are sharing:

1. From the Start screen, type `e`, click **File Explorer**, and select **Computer**.
2. Right-click the optical drive you want to share, and click **Properties**.
3. Click the **Sharing** tab, and then click **Advanced Sharing**.
4. Select the **Share this folder** check box.
5. Type a name for the optical drive in the **Share name** text box.
6. Click **Apply**, and then click **OK**.
7. To view the shared optical drive, from the Start screen, type `n`. In the search box, type `network`, click **Settings**, and then select from the displayed options.

9 Security

Protecting the computer

Standard security features provided by the Windows operating system and the non-Windows Computer Setup utility (BIOS) can protect your personal settings and data from a variety of risks.

NOTE: Security solutions are designed to act as deterrents. These deterrents may not prevent a product from being mishandled or stolen.

NOTE: Before you send your computer for service, back up and delete confidential files, and remove all password settings.

NOTE: Some features listed in this chapter may not be available on your computer.

NOTE: If a webcam is installed or connected to the computer, and if the Face Recognition program is installed, you can set the security level for Face Recognition to balance the ease of use and the difficulty of breaching the security of the computer. Refer to the *HP ProtectTools Getting Started* guide or the Face Recognition software Help.

Computer risk	Security feature
Unauthorized use of the computer	HP ProtectTools Security Manager, in combination with a password, smart card, face recognition, and/or fingerprint reader
Unauthorized access to Computer Setup (f10)	BIOS administrator password in Computer Setup*
Unauthorized access to the contents of a hard drive	DriveLock password in Computer Setup*
Unauthorized startup from an optical drive, diskette drive, or internal network adapter	Boot options feature in Computer Setup*
Unauthorized access to a Windows user account	Windows user password
Unauthorized access to data	• Firewall software • Windows updates • Drive Encryption for HP ProtectTools
Unauthorized removal of the computer	Security cable slot (used with an optional security cable)

*Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load. You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

Using passwords

A password is a group of characters that you choose to secure your computer information. Several types of passwords can be set, depending on how you want to control access to your information. Passwords can be set in Windows or in the non-Windows Computer Setup utility that is preinstalled on the computer.

- Setup and DriveLock passwords are set in Computer Setup and are managed by the system BIOS.
- The embedded security password, which is an HP ProtectTools Security Manager password, can be enabled in Computer Setup to provide BIOS password protection in addition to its normal HP ProtectTools functions. The embedded security password is used with the optional embedded security chip.
- Windows passwords are set only in the Windows operating system.
- If you forget the BIOS administrator password set in Computer Setup, you can use HP SpareKey to access the utility.
- If you forget both the DriveLock user password and the DriveLock master password set in Computer Setup, the hard drive that is protected by the passwords is permanently locked and can no longer be used.

You can use the same password for a Computer Setup feature and for a Windows security feature. You can also use the same password for more than one Computer Setup feature.

Use the following tips for creating and saving passwords:

- When creating passwords, follow requirements set by the program.
- Write down your passwords and store them in a secure place away on the computer.
- Do not store passwords in a file on the computer.

The following tables list commonly used Windows and BIOS administrator passwords and describe their functions.

Setting passwords in Windows

Password	Function
Administrator password*	Protects access to a Windows administrator-level account. **NOTE:** This password cannot be used to access Computer Setup contents.
User password*	Protects access to a Windows user account.
*For information about setting a Windows administrator password or a Windows user password" from the Start screen, type h, and then select **Help and Support**.	

Setting passwords in Computer Setup

Password	Function
BIOS administrator password*	Protects access to Computer Setup.

Password	Function
DriveLock master password*	Protects access to the internal hard drive that is protected by DriveLock. It is also used to remove DriveLock protection. This password is set under DriveLock Passwords during the enable process.
DriveLock user password*	Protects access to the internal hard drive that is protected by DriveLock, and is set under DriveLock Passwords during the enable process.
TPM Embedded Security Device (select models only)	Available/Hidden • If the administrator password is set, you can select **Available**. • If you select **Hidden**, the TPM device is not visible in the operating system.
TPM Status (select models only)	Enabled/disabled • If the administrator password is not set or if the **TPM Security Device** is set to **Hidden**, this entry is hidden. • This value reflects the current physical state for the TPM. The state is enabled or disabled by the Embedded Security State setting.
TPM Set to Factory Defaults (select models only)	No/Yes • If the administrator password is not set or if the TPM Security Device is set to **Hidden**, this entry is hidden. • If the **Embedded Security State** is set to **Enabled**, select **Yes** to reset the TPM to factory settings, and then press f10 to save and exit. A confirmation message is displayed to **Clear the TPM**. Press f1 to reset the TPM, or press f2 to cancel the action.
*For details about each of these passwords, see the following topics.	

Managing a BIOS administrator password

To set, change, or delete this password, follow these steps:

Setting a new BIOS administrator password

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Setup BIOS Administrator Password**, and then press enter.
4. When prompted, type a password.
5. When prompted, type the new password again to confirm.
6. To save your changes and exit Computer Setup, click the **Save** icon and then follow the on-screen instructions.

   – or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Changing a BIOS administrator password

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Change Password**, and then press enter.
4. When prompted, type your current password.
5. When prompted, type your new password again to confirm.
6. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Deleting a BIOS administrator password

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Change Password**, and then press enter.
4. When prompted, type your current password.
5. When prompted for the new password, leave the field empty, and then press enter.
6. Read the warning. To continue, select **YES**.
7. When prompted to type your new password again, leave the field empty, and then press enter.
8. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Entering a BIOS administrator password

At the **BIOS administrator password** prompt, type your password (using the same kind of keys you used to set the password), and then press enter. After 3 unsuccessful attempts to enter the BIOS administrator password, you must restart the computer and try again.

Managing a Computer Setup DriveLock password

⚠ **CAUTION:** To prevent the DriveLock-protected hard drive from becoming permanently unusable, record the DriveLock user password and the DriveLock master password in a safe place away from your computer. If you forget both DriveLock passwords, the hard drive will be permanently locked and can no longer be used.

DriveLock protection prevents unauthorized access to the contents of a hard drive. DriveLock can be applied only to the internal hard drive(s) of the computer. After DriveLock protection is applied to a drive, a password must be entered to access the drive. The drive must be inserted into the computer or an advanced port replicator in order for it to be accessed by the DriveLock passwords.

To apply DriveLock protection to an internal hard drive, a user password and a master password must be set in Computer Setup. Note the following considerations about using DriveLock protection:

- After DriveLock protection is applied to a hard drive, the hard drive can be accessed only by entering either the user password or the master password.
- The owner of the user password should be the day-to-day user of the protected hard drive. The owner of the master password may be either a system administrator or the day-to-day user.
- The user password and the master password can be identical.
- You can delete a user password or master password only by removing DriveLock protection from the drive. DriveLock protection can be removed from the drive only with the master password.

Setting a DriveLock password

To set a DriveLock password in Computer Setup, follow these steps:

1. Turn on the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > DriveLock**, and then press enter.
4. Click Set DriveLock Password (global).
5. Use a pointing device or the arrow keys to select the hard drive you want to protect, and then press enter.
6. Read the warning. To continue, select **YES**.
7. When prompted, type a master password, and then press enter.
8. When prompted, type the master password again to confirm, and then press enter.
9. When prompted, type a user password, and then press enter.
10. When prompted, type the user password again to confirm, and then press enter.

11. To confirm DriveLock protection on the drive you have selected, type `DriveLock` in the confirmation field, and then press enter.

NOTE: The DriveLock confirmation is case sensitive.

12. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

    – or –

    Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Entering a DriveLock password

Be sure that the hard drive is inserted into the computer (not into an optional docking device or external MultiBay).

At the **DriveLock Password** prompt, type your user or master password (using the same kind of keys you used to set the password), and then press enter.

After 2 incorrect attempts to enter the password, you must shut down the computer and try again.

Changing a DriveLock password

To change a DriveLock password in Computer Setup, follow these steps:

1. Turn on the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > DriveLock**, and then press enter.
4. Use a pointing device or the arrow keys select Set DriveLock Password, and then press enter.

   Use the arrow keys to select an internal hard drive, and then press enter.
5. Use a pointing device or the arrow keys to select **Change Password**.
6. When prompted, type your current password, and then press enter.
7. When prompted, type a new password, and then press enter.
8. When prompted, type the new password again to confirm, and then press enter.
9. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Removing DriveLock protection

To remove DriveLock protection in Computer Setup, follow these steps:

1. Turn on the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > DriveLock**, and then press enter.
4. Use a pointing device or the arrow keys to select **Set DriveLock Password**, and then press enter.
5. Use a pointing device or the arrow keys to select Set DriveLock Password, and then press enter.
6. Use a pointing device or the arrow keys to select an internal hard drive, and then press enter.
7. Use a pointing device or the arrow keys to select **Disable protection**.
8. Type your master password, and then press enter.
9. To save your changes and exit Computer Setup, click the **Save** icon and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Using Computer Setup Automatic DriveLock

In a multiple-user environment, you can set an Automatic DriveLock password. When the Automatic DriveLock password is enabled, a random user password and a DriveLock master password will be created for you. When any user passes the password credential, the same random user and DriveLock master password will be used to unlock the drive.

NOTE: You must have a BIOS administrator password before you can access the Automatic DriveLock features.

Entering an Automatic DriveLock password

To enable an Automatic DriveLock password in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Automatic DriveLock**, and then press enter.
4. Use a pointing device or the arrow keys to select an internal hard drive, and then press enter.

5. Read the warning. To continue, select **YES**.
6. To save your changes and exit Computer Setup, click the **Save** icon and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Removing Automatic DriveLock protection

To remove DriveLock protection in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Automatic DriveLock**, and then press enter.
4. Use a pointing device or the arrow keys to select an internal hard drive, and then press enter.
5. Use a pointing device or the arrow keys to select **Disable protection**.
6. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Using antivirus software

When you use the computer to access e-mail, a network, or the Internet, you potentially expose it to computer viruses. Computer viruses can disable the operating system, programs, or utilities, or cause them to function abnormally.

Antivirus software can detect most viruses, destroy them, and, in most cases, repair any damage they have caused. To provide ongoing protection against newly discovered viruses, antivirus software must be kept up to date.

An antivirus program may be preinstalled on your computer and may include a trial offer. It is strongly recommended that you upgrade the trial offer or purchase the antivirus program of your choice in order to fully protect your computer.

To access Help and Support, type `viruses` in the Search box in Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

Using firewall software

Firewalls are designed to prevent unauthorized access to a system or network. A firewall can be a software program you install on your computer and/or network, or it can be a solution made up of both hardware and software.

There are two types of firewalls to consider:

- Host-based firewalls—Software that protects only the computer it is installed on.
- Network-based firewalls—Installed between your DSL or cable modem and your home network to protect all the computers on the network.

When a firewall is installed on a system, all data sent to and from the system is monitored and compared with a set of user-defined security criteria. Any data that does not meet those criteria is blocked.

Your computer or networking equipment may already have a firewall installed. If not, firewall software solutions are available.

NOTE: Under some circumstances a firewall can block access to Internet games, interfere with printer or file sharing on a network, or block authorized e-mail attachments. To temporarily resolve the problem, disable the firewall, perform the task that you want to perform, and then reenable the firewall. To permanently resolve the problem, reconfigure the firewall.

Installing critical security updates

CAUTION: Microsoft® sends out alerts regarding critical updates. To protect the computer from security breaches and computer viruses, install all critical updates from Microsoft as soon as you receive an alert.

Updates to the operating system and other software may have become available after the computer left the factory. To be sure that all available updates are installed on the computer, observe these guidelines:

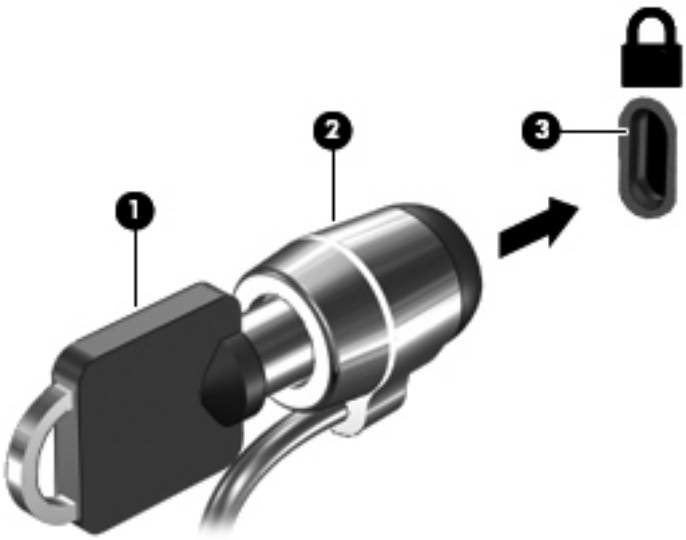
- Run Windows Update as soon as possible after you set up your computer.
- Run Windows Update monthly thereafter.
- Obtain updates to Windows and other Microsoft programs, as they are released, from the Microsoft website and through the updates link in Help and Support. To access Help and Support, from the Start screen, type `h`, and then select **Help and Support**.

Installing an optional security cable

NOTE: A security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

NOTE: The security cable slot on your computer may look slightly different from the illustration in this section. Refer to Getting to know your computer on page 4 for the location of the security cable slot on your computer.

1. Loop the security cable around a secured object.
2. Insert the key **(1)** into the cable lock **(2)**.
3. Insert the cable lock into the security cable slot on the computer **(3)**, and then lock the cable lock with the key.



Using the fingerprint reader (select models only)

Integrated fingerprint readers are available on select computer models. In order to use the fingerprint reader, you must set up a user account with a password on the computer. This account allows you to log on to your computer with a swipe of a designated finger. You may also use the fingerprint reader to fill in password fields on websites and other programs that require a logon. Refer to the fingerprint software Help for instructions.

After you create your fingerprint identity, you can set up a Single Sign On service that allows you to use your fingerprint scanner to create credentials for any application that requires a user name and password.

Locating the fingerprint reader

The fingerprint reader is a small metallic sensor that is located in one of the following areas of your computer:

- Near the bottom of the TouchPad
- On the right side of the keyboard
- On the upper-right side of the display
- On the left side of the display

Depending on your computer model, the reader may be oriented horizontally or vertically. Both orientations require that you swipe your finger perpendicular to the metallic sensor. Refer to Getting to know your computer on page 4 for the location of the reader on your computer.

10 Maintenance

Adding or replacing memory modules

The computer has one memory module compartment. The capacity of the computer can be upgraded by adding a memory module to the vacant expansion memory module slot or by upgrading the existing memory module in the primary memory module slot.

WARNING! To reduce the risk of electric shock and damage to the equipment, unplug the power cord and remove all batteries before installing a memory module.

CAUTION: Electrostatic discharge (ESD) can damage electronic components. Before beginning any procedure, ensure that you are discharged of static electricity by touching a grounded metal object.

CAUTION: To prevent information loss or an unresponsive system:

Shut down the computer before adding or replacing memory modules. Do not remove a memory module while the computer is on, in the Sleep state, or in Hibernation.

If you are not sure whether the computer is off or in Hibernation, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

NOTE: To use a dual-channel configuration when adding a second memory module, be sure that both memory modules are identical.

NOTE: The primary memory is located in the bottom memory slot and the expansion memory is located in the top memory slot.

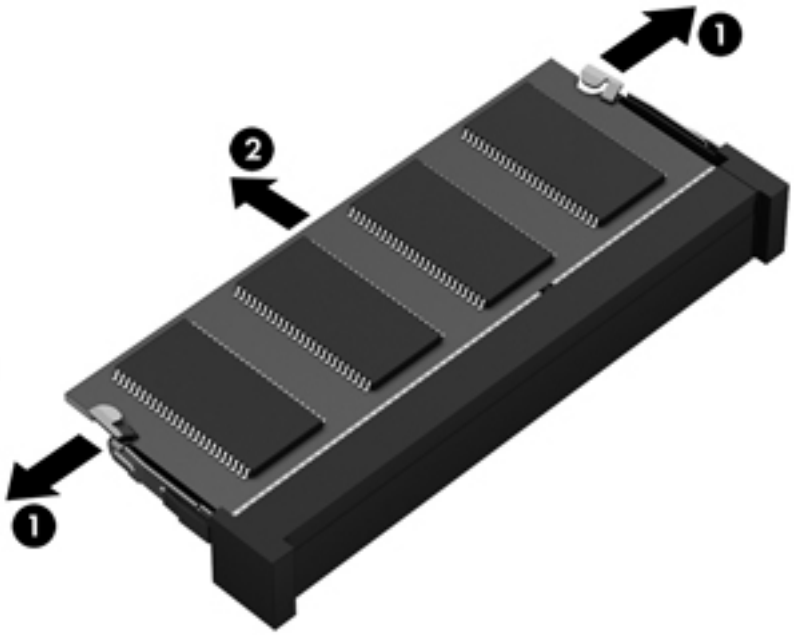
To add or replace a memory module:

1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Remove the battery (see Inserting or removing the battery on page 41.
4. Remove the service cover (see Removing or replacing the service cover on page 55).
5. If you are replacing a memory module, remove the existing memory module:
   a. Pull away the retention clips **(1)** on each side of the memory module.

      The memory module tilts up.

b. Grasp the edge of the memory module **(2)**, rotate to a 45 degree angle, and then gently pull the memory module out of the memory module slot.

⚠ **CAUTION:** To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.



To protect a memory module after removal, place it in an electrostatic-safe container.

6. Insert a new memory module:

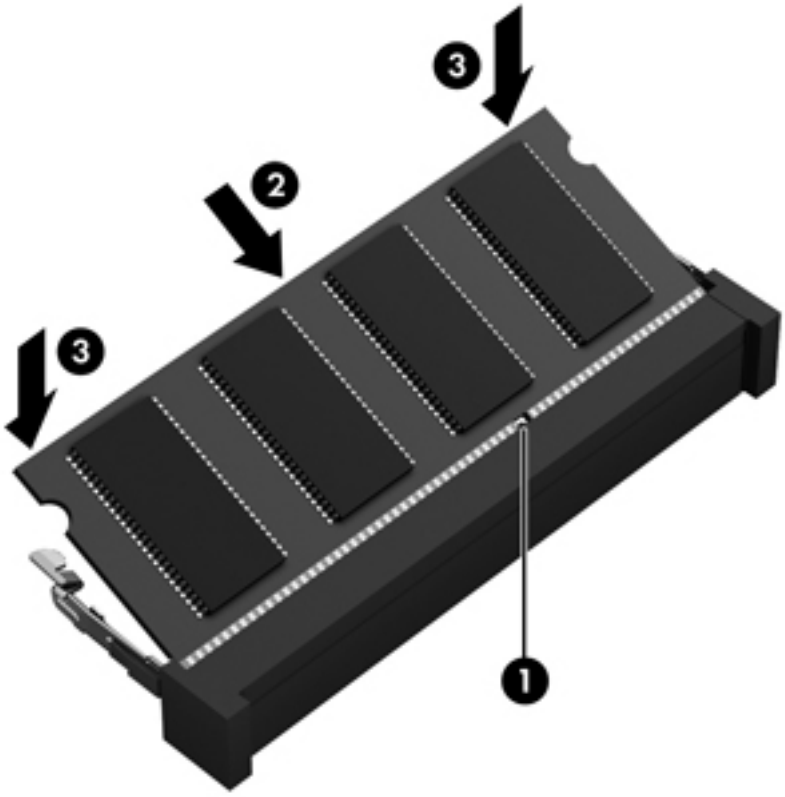
⚠ **CAUTION:** To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.

a. Align the notched edge **(1)** of the memory module with the tab in the memory module slot.

b. With the memory module at a 45-degree angle from the surface of the memory module compartment, press the module **(2)** into the memory module slot until it is seated.

c. Gently press the memory module **(3)** down, applying pressure to both the left and right edges of the memory module, until the retention clips snap into place.

CAUTION: To prevent damage to the memory module, be sure that you do not bend the memory module.



7. Replace the service cover (see Removing or replacing the service cover on page 55).
8. Insert the battery (see Inserting or removing the battery on page 41).
9. Connect AC power and external devices to the computer.
10. Turn on the computer.

Cleaning your computer

Cleaning products

Use the following products to safely clean and disinfect your computer:

- Dimethyl benzyl ammonium chloride 0.3 percent maximum concentration (For example: germicidal disposable wipes. These wipes come in a variety of brand names.)
- Alcohol-free glass cleaning fluid
- Water with mild soap solution

- Dry microfiber cleaning cloth or a chamois (static-free cloth without oil)
- Static-free cloth wipes

CAUTION: Avoid the following cleaning products:

Strong solvents, such as alcohol, acetone, ammonium chloride, methylene chloride, and hydrocarbons, which can permanently damage the surface of the computer.

Fibrous materials, such as paper towels, which can scratch the computer. Over time, dirt particles and cleaning agents can get trapped in the scratches.

Cleaning procedures

Follow the procedures in this section to safely clean your computer.

WARNING! To prevent electric shock or damage to components, do not attempt to clean your computer while it is turned on:

Turn off the computer.

Disconnect external power.

Disconnect all powered external devices.

CAUTION: Do not spray cleaning agents or liquids directly on any computer surface. Liquids dripped on the surface can permanently damage internal components.

Cleaning the display

Gently wipe the display using a soft, lint-free cloth moistened with an *alcohol-free* glass cleaner. Be sure that the display is dry before closing the display.

Cleaning the sides and cover

To clean and disinfect the sides and cover, use a soft microfiber cloth or chamois moistened with one of the cleaning solutions listed previously or use an acceptable germicidal disposable wipe.

NOTE: When cleaning the cover of the computer, use a circular motion to aid in removing dirt and debris.

Cleaning the TouchPad and keyboard

WARNING! To reduce the risk of electric shock or damage to internal components, do not use a vacuum cleaner attachment to clean the keyboard. A vacuum cleaner can deposit household debris on the keyboard surface.

CAUTION: When cleaning the TouchPad and keyboard, do not let liquids drip between the keys. This can permanently damage internal components.

- To clean and disinfect the TouchPad and keyboard, use a soft microfiber cloth or chamois moistened with one of the cleaning solutions listed previously or use an acceptable germicidal disposable wipe.
- To prevent keys from sticking and to remove dust, lint, and particles from the keyboard, use a can of compressed air with a straw extension.

Updating programs and drivers

HP recommends that you update your programs and drivers on a regular basis with the latest versions. Go to http://www.hp.com/support to download the latest versions. You can also register to receive automatic update notifications when they become available.

Using SoftPaq Download Manager

HP SoftPaq Download Manager (SDM) is a tool that provides quick access to SoftPaq information for HP business computers without requiring the SoftPaq number. Using this tool, you can easily search for SoftPaqs, and then download and unpack them.

SoftPaq Download Manager works by reading and downloading, from the HP FTP site, a published database file containing computer model and SoftPaq information. SoftPaq Download Manager allows you to specify one or more computer models to determine which SoftPaqs are available for download.

SoftPaq Download Manager checks the HP FTP site for updates to the database and software. If updates are found, they are downloaded and applied automatically.

SoftPaq Download Manager is available on the HP website. To use SoftPaq Download Manager to download SoftPaqs, you must first download and install the program. Go to the HP website at http://www.hp.com/go/sdm, and follow the instructions to download and install SoftPaq Download Manager.

To download SoftPaqs:

- From the Start screen, type `s`. In the search box, type `softpaq`, and then select HP SoftPaq Download Manager. Follow the instructions to download SoftPaqs.

NOTE: If prompted by User Account Control, click **Yes**.

11 Backup and recovery

To protect your information, use Windows Backup and Restore to back up individual files and folders, back up your entire hard drive, create system repair media (select models only) by using the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

From the Start screen, type `restore`, click **Settings**, and then select from the list of displayed options.

NOTE: For detailed instructions on various backup and restore options, perform a search for these topics in Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

NOTE: Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support for more information. From the Start screen, type `h`, and then select **Help and Support**.

Backing up your information

Recovery after a system failure is as good as your most recent backup. You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. The system repair media (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

On Start screen, type `backup`, click **Settings**, and then select **Save backup copies of your files with File History**.

You can back up your information to an optional external hard drive or a network drive.

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.

To create a backup using Backup and Restore:

NOTE: Be sure that the computer is connected to AC power before you start the backup process.

NOTE: The backup process may take over an hour, depending on file size and the speed of the computer.

1. From the Start screen, type `backup`, click **Settings**, and then select from the list of displayed options.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create system repair media (select models only).

Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

NOTE: If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows 8 operating system media to reboot the computer and repair the operating system.

Using the Windows recovery tools

To recover information you previously backed up:

▲ From the Start screen, type `h`, and then select **Help and Support**.

To recover your information using Startup Repair, follow these steps:

CAUTION: Some Startup Repair options will completely erase and reformat the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition and the Windows partition.

   From the Start screen, type `e`, and then click **File Explorer**.

   – or –

   From the Start screen, type `c`, and then select **Computer**.

   NOTE: If the Windows partition and the HP Recovery partition are not listed, you must recover your operating system and programs using the Windows 8 operating system DVD and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows 8 operating system media (purchased separately) on page 81.
3. If the Windows partition and the HP Recovery partition are listed, restart the computer. After Windows has loaded, press and hold the shift key while clicking **Restart**.

4. Select **Startup Repair**.
5. Follow the on-screen instructions.

NOTE: For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support. From the Start screen, type the letter h, and then select **Help and Support**.

Using f11 recovery tools

CAUTION: Using f11 completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. The f11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using f11:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: From the Start screen, type the letter c, and then select **Computer**.

   NOTE: If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 8 operating system media and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows 8 operating system media (purchased separately) on page 81.
3. If the HP Recovery partition is listed, restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press f11 while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

Using Windows 8 operating system media (purchased separately)

To order a Windows 8 operating system DVD, go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling support. For contact information, see the *Worldwide Telephone Numbers* booklet included with the computer.

CAUTION: Using a Windows 8 operating system media completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows 8 operating system DVD:

NOTE: This process takes several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 8 operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.

After the repair is completed:

1. Eject the Windows 8 operating system media and then insert the *Driver Recovery* media.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

Using HP Software Setup

HP Software Setup can be used to reinstall drivers or select software that has been corrupted or deleted from the system.

1. From the Start screen type, `HP Software Setup`, and select **Apps**.
2. Open HP Software Setup.
3. Follow the on-screen directions to reinstall drivers or select software.

12 Computer Setup (BIOS) and Advanced System Diagnostics

Using Computer Setup

Computer Setup, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

NOTE: Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

NOTE: An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
   - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.
   - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

   NOTE: You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.
2. Press f10 to enter Computer Setup.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:

  Click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

  – or –

  Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press enter.

- To save your changes and exit Computer Setup menus:

  Click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

  – or –

  Use the tab key and the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **File > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

NOTE: Your password settings and security settings are not changed when you restore the factory settings.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be displayed by pressing fn+esc (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press enter.

Downloading a BIOS update

CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. From the Start screen, type `h` and then select **Help and Support**.
2. In the **Help and Support** search box, type `maintain`, and then follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:
   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
   b. Follow the on-screen instructions to download your selection to the hard drive.

      Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

NOTE: If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed, follow these steps:

1. From the Start screen, type `e`, and then click **File Explorer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Using Advanced System Diagnostics

Advanced System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in Advanced System Diagnostics:

- System Tune-Up—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.
- Start-up test—This test analyzes the main computer components that are required to start the computer.
- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- Battery test—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact HP support to report the issue and purchase a replacement battery.
- BIOS Management—You can update or rollback the version of the BIOS on the system. Do not shut down or remove external power during the process. You will be given a confirmation screen before your BIOS is modified. Select **BIOS update**, **BIOS Rollback**, or **Back to main menu**.

You can view system information and error logs or select languages in the Advanced System Diagnostics window.

To start Advanced System Diagnostics:

1. Turn on or restart the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f2.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostics test while it is running, press esc.

13 Support

Contacting support

If the information provided in this user guide or Help and Support does not address your questions, you can contact support. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

Here you can:

- Chat online with an HP technician.

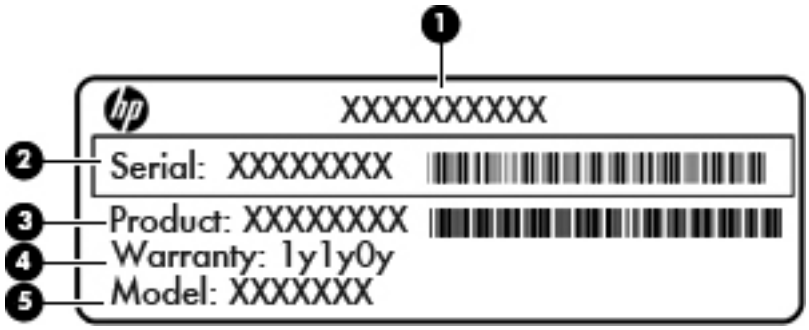
  NOTE: When support chat is not available in a particular language, it is available in English.

- E-mail support.
- Find support telephone numbers.
- Locate an HP service center.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer:

- Service label—Provides important information, including the following:



Component	
(1)	Product name
(2)	Serial number (s/n)
(3)	Part number/Product number (p/n)
(4)	Warranty period
(5)	Model description

  Have this information available when you contact support. The service label is affixed inside the battery bay.

- Microsoft® Certificate of Authenticity—Contains the Windows Product Key. You may need the Product Key to update or troubleshoot the operating system. The Microsoft Certificate of Authenticity is affixed inside the battery bay.
- Regulatory label—Provides regulatory information about the computer. The regulatory label is affixed inside the battery bay.
- Wireless certification label or labels (select models only)—Provide information about optional wireless devices and the approval markings of some of the countries or regions in which the devices have been approved for use. If your computer model includes one or more wireless devices, one or more certification labels are included with your computer. You may need this information when traveling internationally. Wireless certification labels are affixed inside the battery bay.
- SIM (subscriber identity module) label (select models only)—Provides the ICCID (Integrated Circuit Card Identifier) of the SIM. This label is located inside the battery bay.
- HP Mobile Broadband Module service number label (select models only)—Provides the serial number of the HP Mobile Broadband Module. This label is located inside the battery bay.

14 Specifications

- Input power
- Operating environment

Input power

The power information in this section may be helpful if you plan to travel internationally with the computer.

The computer operates on DC power, which can be supplied by an AC or a DC power source. The AC power source must be rated at 100–240 V, 50–60 Hz. Although the computer can be powered from a standalone DC power source, it should be powered only with an AC adapter or a DC power source supplied and approved by HP for use with this computer.

The computer can operate on DC power within the following specifications.

Input Power	Rating
Operating voltage and current	18.5 V dc @ 3.5A or 19.5 V dc @ 3.33A – 65W 19 V dc @ 4.74A or 19.5 V dc @ 4.62A – 90W

NOTE: This product is designed for IT power systems in Norway with phase-to-phase voltage not exceeding 240 V rms.

NOTE: The computer operating voltage and current can be found on the system regulatory label.

Operating environment

Factor	Metric	U.S.
Temperature		
Operating (writing to optical disc)	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	**10% to 90%**	10% to 90%
Nonoperating	**5% to 95%**	5% to 95%
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

A Traveling with the computer

For best results, follow these traveling and shipping tips:

- Prepare the computer for traveling or shipping:
  - Back up your information.
  - Remove all discs and all external media cards, such as digital cards.

    CAUTION: To reduce the risk of damage to the computer, damage to a drive, or loss of information, remove the media from a drive before removing the drive from a drive bay and before shipping, storing, or traveling with a drive.
  - Turn off and then disconnect all external devices.
  - Shut down the computer.
- Take along a backup of your information. Keep the backup separate on the computer.
- When traveling by air, carry the computer as hand luggage; do not check it in with the rest of your bags.

CAUTION: Avoid exposing a drive to magnetic fields. Security devices with magnetic fields include airport walk-through devices and security wands. Airport conveyer belts and similar security devices that check carry-on baggage use X-rays instead of magnetism and do not damage drives.

- In-flight computer use is at the discretion of the airline. If you plan to use the computer during a flight, check with the airline in advance.
- If the computer will be unused and disconnected from external power for more than 2 weeks, remove the battery and store it separately.
- If you are shipping the computer or a drive, use suitable protective packaging and label the package “FRAGILE.”
- If the computer has a wireless device or an HP Mobile Broadband Module installed, such as an 802.11b/g device, a Global System for Mobile Communications (GSM) device, or a General Packet Radio Service (GPRS) device, the use of these devices may be restricted in some environments. Such restrictions may apply onboard aircraft, in hospitals, near explosives, and in

hazardous locations. If you are uncertain of the policy that applies to the use of a particular device, ask for authorization to use it before you turn it on.

- If you are traveling internationally, follow these suggestions:
  - Check the computer-related customs regulations for each country or region on your itinerary.
  - Check the power cord and adapter requirements for each location in which you plan to use the computer. Voltage, frequency, and plug configurations vary.

    ⚠ **WARNING!** To reduce the risk of electric shock, fire, or damage to the equipment, do not attempt to power the computer with a voltage converter kit sold for appliances.

B Troubleshooting

The following sections are included in this appendix:

Troubleshooting resources

- Access website links and additional information about the computer through Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

NOTE: Some checkup and repair tools require an Internet connection. HP also provides additional tools that do not require an Internet connection.

- Contact HP support. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

  Choose from the following types of support:

  - Chat online with an HP technician.

    NOTE: When chat is not available in a particular language, it is available in English.

  - E-mail HP support.
  - Find HP support worldwide telephone numbers.
  - Locate an HP service center.

Resolving issues

The following sections describe several common issues and solutions.

The computer is unable to start up

If the computer does not turn on when you press the power button, the following suggestions may help you determine why the computer does not start up:

- If the computer is plugged into an AC outlet, plug another electrical device into the outlet to be sure that the outlet is providing adequate power.

NOTE: Use only the AC adapter provided with the computer or one approved by HP for this computer.

- If the computer is plugged into an external power source other than an AC outlet, plug the computer into an AC outlet using the AC adapter. Be sure that the power cord and AC adapter connections are secure.

The computer screen is blank

If the screen is blank but you have not turned off the computer, one or more of these settings may be the cause:

- The computer may be in the Sleep state. To exit Sleep, briefly press the power button. Sleep is an energy-saving feature that turns off the display. Sleep can be initiated by the system while the computer is on but is not in use, or when the computer has reached a low battery level. To change these and other power settings, right-click the **Battery** icon in the notification area, at the far right of the taskbar, and then click **Preferences**.
- The computer may not be set to display the image on the computer screen. To transfer the image to the computer screen, press fn+f4. On most models, when an optional external display, such as a monitor, is connected to the computer, the image can be displayed on the computer screen or the external display, or on both devices simultaneously. When you press fn+f4 repeatedly, the image alternates among the computer display, one or more external displays, and simultaneous display on all devices.

Software is functioning abnormally

If the software is unresponsive or responds abnormally, restart the computer by pointing to the right side of the screen. When the charms display, click **Settings**. Click the **Power** icon, and then click **Shut down**. If you cannot restart the computer using this procedure, see the next section, The computer is on but not responding on page 95.

The computer is on but not responding

If the computer is turned on but is not responding to software or keyboard commands, try the following emergency shutdown procedures, in the sequence provided, until shutdown occurs:

CAUTION: Emergency shutdown procedures result in the loss of unsaved information.

- Press and hold the power button for at least 5 seconds.
- Disconnect the computer from external power and remove the battery.

The computer is unusually warm

It is normal for the computer to feel warm to the touch while it is in use. But if the computer feels *unusually* warm, it may be overheating because a vent is blocked.

If you suspect that the computer is overheating, allow the computer to cool to room temperature. Be sure to keep all vents free from obstructions while you are using the computer.

WARNING! To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

NOTE: The fan in the computer starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during operation.

An external device is not working

Follow these suggestions if an external device does not function as expected:

- Turn on the device according to the manufacturer's instructions.
- Be sure that all device connections are secure.
- Be sure that the device is receiving electrical power.
- Be sure that the device, especially if it is older, is compatible with the operating system.
- Be sure that the correct drivers are installed and updated.

The wireless network connection is not working

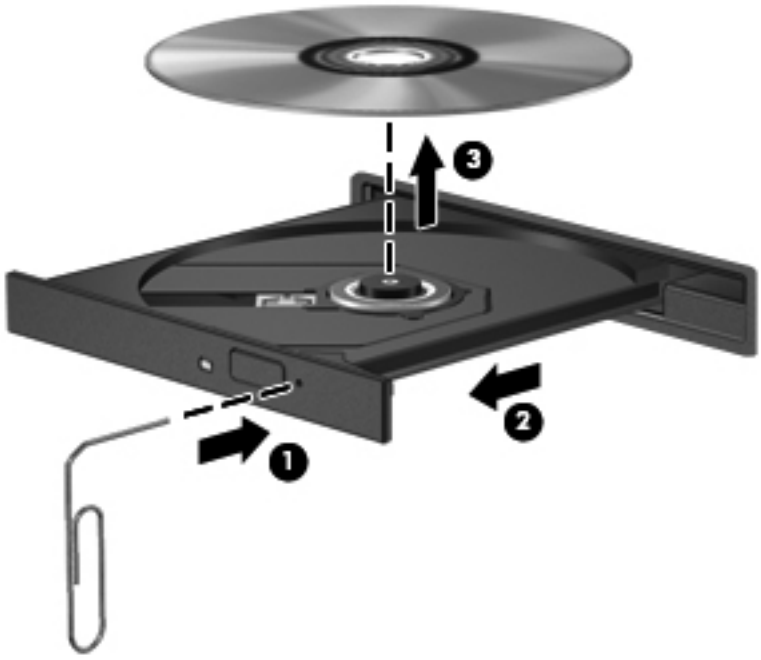
If a wireless network connection is not working as expected, follow these suggestions:

- To enable or disable a wireless or wired network device, right-click the **Network Connection** icon in the notification area, at the far right of the taskbar. To enable devices, select the check box from the menu option. To disable the device, clear the check box.
- Be sure that the wireless device is turned on.
- Be sure that the computer wireless antennas are free from obstructions.
- Be sure that the cable or DSL modem and its power cord are properly connected and that the lights are on.
- Be sure that the wireless router or access point is properly connected to its power adapter and to the cable or DSL modem, and that the lights are on.
- Disconnect and then reconnect all cables, and turn the power off and then back on.

The optical disc tray does not open for removal of a CD or DVD

1. Insert the end of a paper clip **(1)** into the release access in the front bezel of the drive.
2. Press in gently on the paper clip until the disc tray is released, and then pull out the tray **(2)** until it stops.
3. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

NOTE: If the tray is not fully accessible, tilt the disc carefully as you remove it.



4. Close the disc tray and place the disc in a protective case.

The computer does not detect the optical drive

If your operating system does not detect an installed device, the device driver software may be missing or corrupted.

1. Remove any discs from the optical drive.
2. Click **Computer** and then click **System Monitor**.
3. From the **Hardware** tab, identify the Storage Controller in the **Type** column.
4. Click the triangle next to the devices until you locate your optical drive. If the drive is listed, it should be functioning correctly.

A disc does not play

- Save your work and close all open programs before playing a CD or a DVD.
- Log off the Internet before playing a CD or a DVD.
- Be sure that you insert the disc properly.
- Be sure that the disc is clean. If necessary, clean the disc with filtered water and a lint-free cloth. Wipe from the center of the disc to the outer edge.
- Check the disc for scratches. If you find scratches, treat the disc with an optical disc repair kit available at many electronics stores.
- Disable Sleep mode before playing the disc.

  Do not initiate Sleep while playing a disc. Otherwise, you may see a warning message asking if you want to continue. If this message is displayed, click **No**. After you click No, the computer may behave in either of the following ways:

  - Playback may resume.

  – or –

  - The playback window in the multimedia program may close. To return to playing the disc, click the **Play** button in your multimedia program to restart the disc. In rare cases, you may need to exit the program and then restart it.

A movie is not visible on an external display

1. If both the computer display and an external display are turned on, press fn+f4 one or more times to switch between the 2 displays.
2. Configure the monitor settings to make the external display primary:

   a. From the Windows desktop, right-click on a blank area of the computer desktop, and select **Screen resolution**.

   b. Specify a primary display and a secondary display.

NOTE: When using both displays, the DVD image will not appear on any display designated as the secondary display.

The process of burning a disc does not begin, or it stops before completion

- Be sure that all other programs are closed.
- Turn off Sleep mode.
- Be sure that you are using the right kind of disc for your drive.
- Be sure that the disc is inserted properly.
- Select a slower write speed and try again.
- If you are copying a disc, save the information on the source disc to your hard drive before trying to burn the contents to a new disc, and then burn from your hard drive.

C Electrostatic discharge

Electrostatic discharge is the release of static electricity when two objects come into contact—for example, the shock you receive when you walk across the carpet and touch a metal door knob.

A discharge of static electricity from fingers or other electrostatic conductors may damage electronic components. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

- If removal or installation instructions direct you to unplug the computer, unplug it after being properly grounded and before removing a cover.
- Keep components in their electrostatic-safe containers until you are ready to install them.
- Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.
- Use nonmagnetic tools.
- Before handling components, discharge static electricity by touching an unpainted metal surface of the component.
- If you remove a component, place it in an electrostatic-safe container.

If you need more information about static electricity or assistance with component removal or installation, contact HP support.

Index

A

AC adapter, testing 44
AC adapter/battery light 10
administrator password 65
advanced system diagnostics 87
airport security devices 54
antivirus software 71
audio functions, checking 34
audio-in (microphone) jack, identifying 11
audio-out (headphone) jack, identifying 11
Automatic DriveLock password
  entering 70
  removing 71

B

Backup and Restore 79
battery
  conserving power 42
  discharging 40
  displaying remaining charge 40
  disposing 43
  low battery levels 41
  replacing 43
  storing 42
battery bay 16, 89
Battery Check 40
battery information, finding 40
battery power 40
battery release latch 16
battery temperature 42
BIOS
  determining version 85
  downloading an update 86
  updating 85
Bluetooth device 18, 23
Bluetooth label 89
Bluetooth, identifying compartment 17
buttons
  left TouchPad 4
  media 33
  power 7, 37
  right TouchPad 5
  TouchPad 4
  volume 34

C

cables
  eSATA 52
  USB 51
caps lock light, identifying 6
caring for your computer 76
Certificate of Authenticity label 89
checking audio functions 34
cleaning your computer 76
components
  bottom 16
  display 15
  front 10
  left side 13
  rear 14
  right side 11
  top 4
Computer Setup
  BIOS administrator password 66
  DriveLock password 68
  navigating and selecting 83
  restoring factory settings 84
computer, traveling 42, 92
configuring
  ExpressCards 47
connecting to a WLAN 21
connector, docking 53
connector, power 13
conservation, power 42
corporate WLAN connection 21
critical battery level 38
critical updates, software 72

D

digital card
  inserting 46
  removing 47
  supported formats 46
Disk Cleanup software 57
Disk Defragmenter software 57
display image, switching 30
display port; identifying 11
DisplayPort, connecting 36
docking connector 53
docking connector; identifying 12
drive media 38
DriveLock password
  changing 69
  description 68
  entering 69
  removing 70
  setting 68
drives
  external 53
  handling 54
  hard 53
  optical 53
  using 55

E

electrostatic discharge 100
embedded numeric keypad, identifying 9, 31
eSATA cable, connecting 52
eSATA devices
  connecting 52

defined 51
removing 52
eSATA/USB 2.0 combo port, identifying 11
esc key, identifying 9
ExpressCard
configuring 47
defined 47
inserting 48
removing 49
removing insert 48
ExpressCard slot; identifying 11
external AC power, using 43
external devices 52
external drive 53
external monitor port 14, 35

F
f11 recovery 81
Face Recognition 35
face recognition 64
fingerprint reader 73
fingerprint reader, identifying 8
firewall software 71
fn key, identifying 9, 30
fun things to do 1
function keys, identifying 9

G
graphics modes, switching 44

H
hard drive
external 53
HP 3D DriveGuard 57
removing 56
hard drive light 10, 58
hard drive recovery 81
headphone (audio-out) jack 11
Hibernation
exiting 38
initiating 38
hot keys
adjusting volume 30
battery charge 30
description 30
using 30
hotkeys
decrease screen brightness 31
increase screen brightness 31
Sleep 30
switching screen image 30
hotkeys, media 33
HP 3D DriveGuard 57
HP Mobile Broadband, disabled 22
hubs 50

I
input power 90
integrated webcam light, identifying 15
internal microphones, identifying 15
Internet connection setup 20
issues, resolving 94

J
jacks 13
audio-in (microphone) 11
audio-out (headphone) 11
RJ-11 (modem) 13
Java Card
defined 49
inserting 50
removing 50

K
keyboard hot keys, identifying 30
keyboard, identifying
ambient light sensor 15
light 15
light button 15
keypad
embedded numeric 9
identifying 31
keypad, external
num lock 32
using 32
keys
esc 9
fn 9
function 9
media 33
volume 34
Windows applications 9
Windows logo 9

L
labels
Bluetooth 89
HP Mobile Broadband Module 89
Microsoft Certificate of Authenticity 89
regulatory 89
serial number 89
SIM 89
wireless certification 89
WLAN 89
latch, battery release 16
legacy support, USB 83
lights
AC adapter/battery 10
caps lock 6
hard drive 10
mute 6
num lock 6
power 6, 10
TouchPad 6
webcam 15
wireless 6, 10
lights, hard drive 58
low battery level 41

M
maintenance
Disk Cleanup 57
Disk Defragmenter 57
media activity controls 33
Media Card Reader, identifying 11
media hotkeys 33
memory module
inserting 75
removing 74
replacing 74
microphone (audio-in) jack, identifying 11
Microsoft Certificate of Authenticity label 89
mouse, external
setting preferences 26
mute light, identifying 6

N
num lock light 6
num lock, external keypad 32

O
operating environment 91

operating system
Microsoft Certificate of Authenticity label 89
Product Key 89
optical disc
inserting 59
removing 60
optical drive 53
optical drive light, identifying
optical drive light 13
optical drive, identifying 13
optional external devices, using 52

P
passwords
administrator 65
BIOS administrator 66
DriveLock 68
user 65
pinching TouchPad gesture 28
pointing devices, setting preferences 26
pointing stick 4
left button 4
right button 5
ports
DisplayPort 36
eSATA/USB 2.0 combo 11
external monitor 14, 35
USB 2.0 14
USB charging 14
VGA 35
power
battery 40
conserving 42
options 38
power button 37
power button, identifying 7
power connector, identifying 13
power lights 6, 10
power meter 39
power switch 37
power-saving states 38
Product Key 89
product name and number, computer 89
public WLAN connection 21

R
readable media 38
recovery partition 81
regulatory information
regulatory label 89
wireless certification labels 89
restoring the hard drive 81
RJ-11 (modem) jack, identifying 13
RJ-45 (network) jack, identifying 13
rotating TouchPad gesture 29

S
screen brightness keys 31
screen image, switching 30
scrolling TouchPad gesture 28
security 12
security, wireless 20
serial number 89
serial number, computer 89
service cover, identifying 16
setting password protection on wakeup 39
setting power options 38
setup of WLAN 20
setup utility
navigating and selecting 83
restoring factory settings 84
sharing optical drives 63
shutdown 37
SIM
inserting 22
SIM slot, identifying 16
Sleep
exiting 38
initiating 38
slots
SIM 16
smart card
defined 49
inserting 50
removing 50
smart card reader; identifying 13
SoftPaqs, downloading 78
software
antivirus 71
critical updates 72
Disk Cleanup 57
Disk Defragmenter 57
firewall 71
speaker, identifying 17
storing a battery 42
switch, power 37
switchable graphics 44

T
temperature 42
testing an AC adapter 44
TouchPad
buttons 4
using 26
TouchPad button, identifying 4
TouchPad gestures
pinching 28
rotating 29
scrolling 28
zooming 28
TouchPad light, identifying 6
TouchPad zone, identifying 4
traveling with the computer 42, 89, 92
tray-load optical drive 59
troubleshooting
disc burning 99
disc play 98
optical disc tray 97
optical drive detection 98
troubleshooting, external display 98
turning off the computer 37

U
unresponsive system 37
USB cable, connecting 51
USB charging port 14
USB devices
connecting 51
description 50
removing 51
USB hubs 50
USB legacy support 83
USB port, identifying 11, 14
user password 65
using
external AC power 43
power meter 39
power-saving states 38

V

vents, identifying 10, 11, 17
VGA port, connecting 35
video 35
volume
  adjusting 34
  buttons 34
  keys 34
volume keys, identifying 30

W

webcam 15, 35
webcam light, identifying 15
webcam, identifying 15
Windows 8 operating system
  DVD 81
Windows applications key,
  identifying 9
Windows logo key, identifying 9
wireless antennas, identifying 15
wireless button 18
wireless certification label 89
wireless controls
  button 18
  operating system 18
wireless light 6, 10, 18
wireless network (WLAN)
  connecting 21
  corporate WLAN connection
    21
  equipment needed 20
  functional range 21
  public WLAN connection 21
  security 20
  using 19
WLAN antennas, identifying 15
WLAN device 19, 89
WLAN label 89
writable media 38
WWAN antennas, identifying 15
WWAN device 18, 21

Z

zooming TouchPad gesture 28